

Consultation Paper



Issues for Discussion

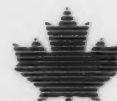
INDUSTRIAL COMPETITIVENESS

A Sectoral Perspective



Industry, Science and
Technology Canada

Industrie, Sciences et
Technologie Canada



PROSPERITY INITIATIVE
INITIATIVE PROSPÉRITÉ

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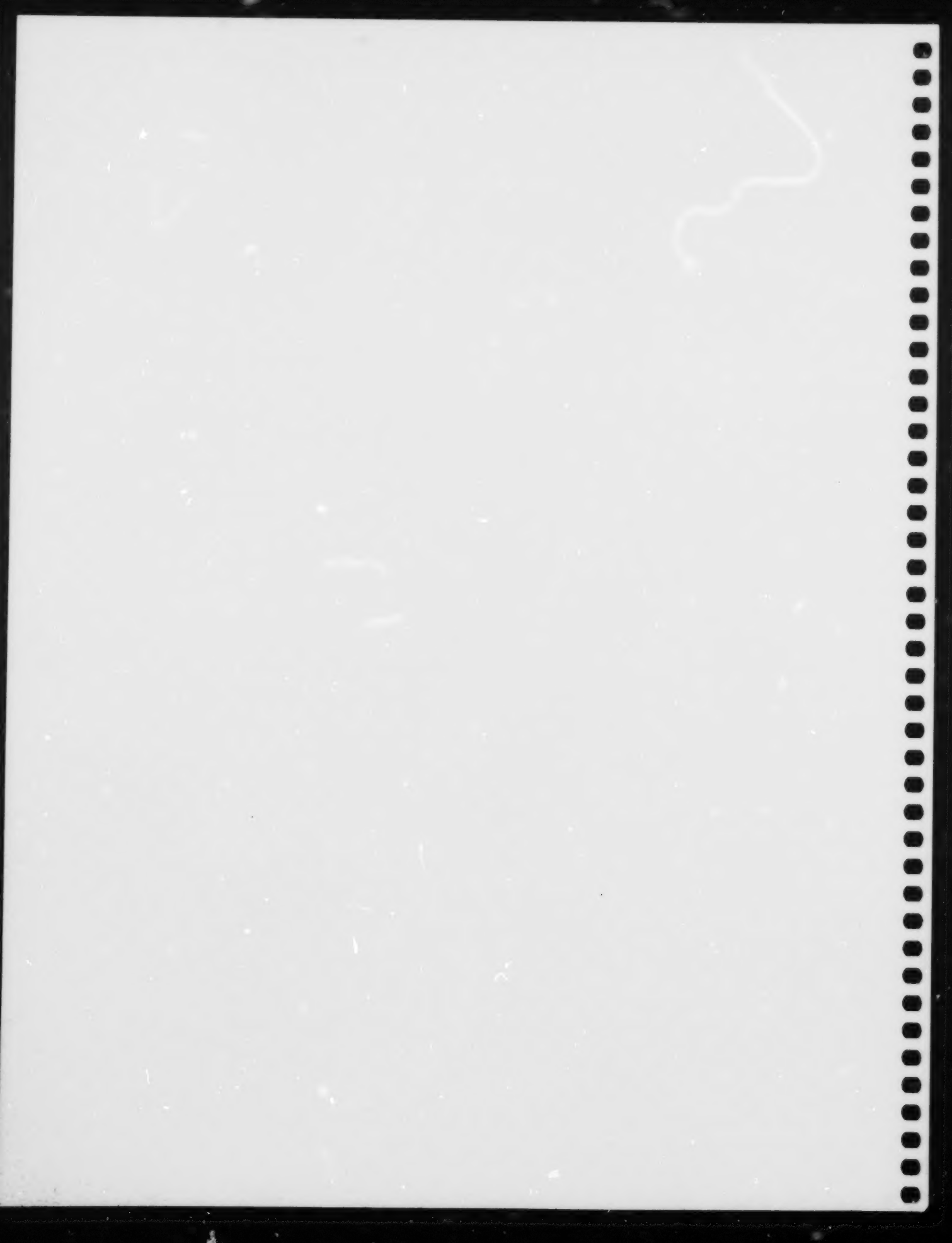
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INDUSTRIAL COMPETITIVENESS

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Acronyms and Abbreviations

IRAP	Industrial Research Assistance Program
GST	Goods and Services Tax
MST	Manufacturers' Sales Tax
ISTC	Industry, Science and Technology Canada
EC	European Community
OECD	Organization for Economic Cooperation and Development
DIPP	Defence Industry Productivity Program
G-7	Group of Seven Industrial Countries (Canada, Japan, United Kingdom, France, Italy, Germany and the United States)
NAFTA	North American Free Trade Agreement
FTA	Canada-U.S. Free Trade Agreement
JIT	Just-In-Time (manufacturing or inventory control)
MFN	Most Favoured Nation
AMTAP	Advanced Manufacturing Technology Application Program
SIC	Standard Industrial Classification
MNE	Multinational Enterprise
SMEs	Small to Medium-sized enterprises
STA	Short-Term Arrangement on Cotton Textiles
LTA	Long-Term Arrangement on Cotton Textiles
MFA	Arrangement Regarding International Trade in Textiles (popularly known as the multifibre arrangement)
CIM	Computer-Integrated Manufacturing
CAD	Computer-Aided Design
CAM	Computer-Aided Manufacturing
NATO	North Atlantic Treaty Organization
GDP	Gross Domestic Product
EDC	Export Development Corporation
VRA	Voluntary Restraint Agreements Program
MTN	Multilateral Trade Negotiations

THE COMPETITIVE CHALLENGES FACING CANADIAN INDUSTRY IN THE 1990s, IN BOTH the domestic and international markets, are the issues addressed in this paper. The world is changing in fundamental ways. Globalization of economic production, the formation of trading blocs, and rapid advances in information and other technologies are changing the way business is carried out. These international changes create new challenges for Canadian industry and managers, but also new opportunities for those who adapt quickly and are able to build on their strengths. Falling behind is not an option if Canada's standard of living, ability to create rewarding jobs, environment and quality of life are to be maintained or enhanced.

Over the last half decade, Canada's aggregate economic performance has been strong. Growth in real output was second only to Japan, while employment creation outstripped the performance of all major industrialized countries of the world. However, in the 1980s our productivity performance deteriorated, causing Canada's international competitiveness to weaken, and calling into question its ability to maintain a strong economic performance in the coming decade.

Canadian industry is in the process of restructuring. This restructuring is in response to significantly increased international competitive pressures as markets are liberalized, both internationally and regionally. The recent recession has accelerated this restructuring process. As international trade continues to grow more rapidly than global production, there will be significant opportunities for Canadian industry to continue to reap the benefits of global trade liberalization — if it succeeds in strengthening its competitiveness in the 1990s.

Problems notwithstanding, Canada is viewed by foreign investors as an excellent country in which to invest. It is seen to possess an excellent quality of life; abundant natural resources; a stable political environment; a tolerant and hospitable social environment; an educated and motivated work force; a system of first-class universities; highly sophisticated public and private infrastructure; and preferential access to the world's largest and most prosperous market.

This discussion paper focuses on industrial competitiveness from a sectoral perspective, and is intended to contribute to the Government of Canada's Prosperity Initiative. Canada's future prosperity depends on its ability to compete successfully at home and abroad, which in turn depends on the willingness of Canadians to develop a renewed sense of partnership. The issues on which advice and participation are being sought relate to the key elements of Canada's future prosperity identified in *Prosperity Through Competitiveness*. These issues are: human resources, science and technology, financing investment, competitive domestic markets and trading relationships.

The fundamental factors influencing the competitiveness of 16 manufacturing and service sectors are identified. Based on these analyses, the paper also attempts to identify, for discussion purposes, the major issues and challenges that stakeholders in Canada's future prosperity need to address in the 1990s in order to strengthen the international competitiveness of Canadian industry. Major common challenges, identified from the sectoral perspectives, are to:

- develop and implement new corporate strategies appropriate to an increasingly competitive global environment;
- build on the successes of our strong resource-based industries and our export-oriented manufacturing industries;
- increase the international orientation of Canadian industries and enterprises;
- develop fruitful linkages among services and goods-producing enterprises in support of international trade and industrial competitiveness;

- move toward the production of more highly fabricated and higher-value-added goods and services;
- increase significantly Canadian investments in R&D, build upon our strengths in the product-innovation field, and strengthen performance in the development and diffusion of process and organizational innovations;
- develop and implement effective Total Quality Management approaches to achieving continuous quality and productivity improvements in serving customers;
- develop fruitful domestic and international linkages and partnerships among Canadian enterprises, suppliers and customers, and centres of technological expertise;
- strengthen significantly investment in human resource development, including the training of the work force and the development of more effective training approaches and infrastructures;
- dismantle interprovincial barriers to trade and the mobility of labour to achieve a national economy truly open to all Canadian industrial enterprises and workers;
- further reduce barriers to accessing North American and overseas markets; and
- develop a strong sense of national purpose and partnership among all the stakeholders in Canada's future prosperity — business, labour, governments at all levels, educational institutions, and individual Canadians.

The purpose of the paper is to act as a catalyst, to spur discussion in order to obtain the views of stakeholders on whether the right issues have been identified and on what new approaches and partnerships are required to address these issues more effectively in the future. Consultations will provide a significant opportunity to illustrate and illuminate, from a sectoral perspective, potential new approaches and opportunities for partnerships capable of strengthening Canada's competitive performance in the 1990s. All stakeholders in Canada's future prosperity must agree on where the country should go and how it should get there.

Prosperity Through Competitiveness stresses:

"Progress will not come quickly, nor will it come through grandiose schemes or solutions imposed by governments. Governments clearly have a role to play in the process, but too much government direction and costly new burdens for the Canadian taxpayer would do more harm than good. Progress will come through the cumulative impact of a large number of diverse changes, changes made possible by the deliberate investment of time, money and energy by many individuals, organizations and firms. Indeed, given the complexity and wide variety of the initiatives that are needed, unless those outside government take on a major responsibility for the changes required, we will not succeed."

**CANADA IN A CHANGING
WORLD: The Need to
be Competitive**

IN THE LAST DECADE WE HAVE WITNESSED PROFOUND SHIFTS IN THE INTERNATIONAL marketplace. The globalization of market forces, the speed with which technological advancements are disseminated throughout the world, global capital flows and the rising importance of the newly industrialized nations have all combined to effect radical change in the world economy. These changes are forcing adjustment on all industrialized nations, including Canada.

The World is Changing Rapidly — With Important Implications for Canada

"In a global economy, the only lasting security is found in being competitive."¹

"For a firm, competitiveness is the ability to design, develop, manufacture and market products at home and in other nations in competition with other firms. For a nation, it means doing all this without a decline in the real standards of living of its citizens. This means for advanced nations ... [providing] the rising productivity and superior product quality that makes goods from high-wage nations, [such as Canada] attractive and affordable."²

Until fairly recently, companies were situated firmly in their home countries, international economic relations were based on trade flows between countries, and domestic investment and employment were relatively secure. Today, a new industrial structure is forming, led by corporations that view national markets in the context of achieving competitive advantage in the global economy. In this world marketplace, national allegiances matter less than long-term strategic considerations such as productivity performance, the availability of skilled labour, a stable economic environment and access to key market niches. More and more, investment flows are following trade patterns, or being substituted for them, as companies use capital to gain access to key markets and technologies. In this new environment, the competitive attributes and relative attractiveness of our domestic economy will increasingly determine our ability to sustain our high wages and standard of living.

At the same time, technology is changing rapidly, and the ease and speed with which information and knowledge flow across national boundaries is increasing. Together, these trends are altering the very nature of the products being traded in the global marketplace. Resource-based trading relationships are growing, but less rapidly than in the past, as improved extraction methods, recycling, substitution of more knowledge-intensive products and other factors reduce the demand for primary products. In addition, production and exploration costs of existing resource-based exporters are rising and they face strong competition from new suppliers.

On the other hand, as incomes rise, trade in manufactured goods is growing quickly, particularly for more sophisticated end products. Increasingly, the economic transformation of the newly industrialized nations has led to a geographic shift in industrial activities. Asian and Latin American countries are now producing many manufactured products that were once the preserve of the major industrialized countries.

The nature of competition also is shifting, with an increased emphasis on quality production. Approaches such as Total Quality Management, pioneered by the Japanese, are aimed at continuously enhancing product quality and service to the customer by requiring all functional units within the organization — planning, design and development, production, purchasing, marketing, finance and customer services — to work cooperatively.

These changes mean greater international competition on all fronts. Every economy in the world is facing strong competitive challenges. If we are to maintain our high standard of living, we cannot resist

¹ Byrne Purchase of the C.D. Howe Institute.

² U.S. Congress Office of Technology Assessment Special Report (1988), *Paying the Bill: Manufacturing and America's Trade Deficit*, p.25.

change, we must adapt quickly to the new global realities. Our responses must be innovative and forward looking if we are to increase our prosperity.

Canada Also is Changing

Canada's prosperity and high standard of living are rooted firmly in our wealth of natural resources. However, to sustain our high-wage economy, we must continue shifting to ever higher value-added goods and services and produce the highest quality products possible.

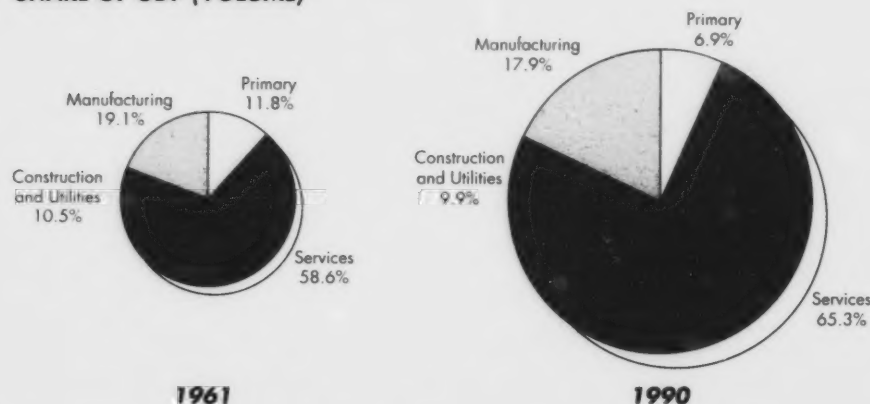
Our economy, like those of many other industrialized countries, is shifting away from the goods-producing sectors to the services sector. This is partly because the distinction between goods and services is becoming less clear as manufacturing processes integrate a broader range of sophisticated service inputs. Although the primary and manufacturing sectors account for a smaller share of the economy now than they did in the past in terms of output and employment, they are continuing to grow in absolute size (Chart 1).

Over the last 30 years, the structure of our manufacturing sector has been shifting to more sophisticated, often information-based end products. For example, the transportation equipment, and machinery and electrical products sectors have increased their share of total output, while the food, forest products, and metals and minerals sectors' outputs have declined (Chart 2). Nevertheless, Canada's broad industrial structure still relies more heavily on resources and low-value-added manufactures than do many other industrialized countries.

Our exports also have been shifting toward high-value-added products. Even so, over half of our exports are still in primary and lesser-manufactured categories (Chart 3). On the import side, we are heavy importers of sophisticated manufactures such as machinery and electrical equipment (Chart 4).

World trade in services is of growing importance, accounting for an increasing share of economic activity in virtually all markets. Although Canadian services trade, in contrast to global norms, is not growing as a proportion of total trade, our export of business services is expanding rapidly. In addition, most of our goods exports rely on producer services as key inputs, partly determining their success in international markets.

**CHART 1
CANADIAN ECONOMY BY SECTOR
SHARE OF GDP (VOLUME)***

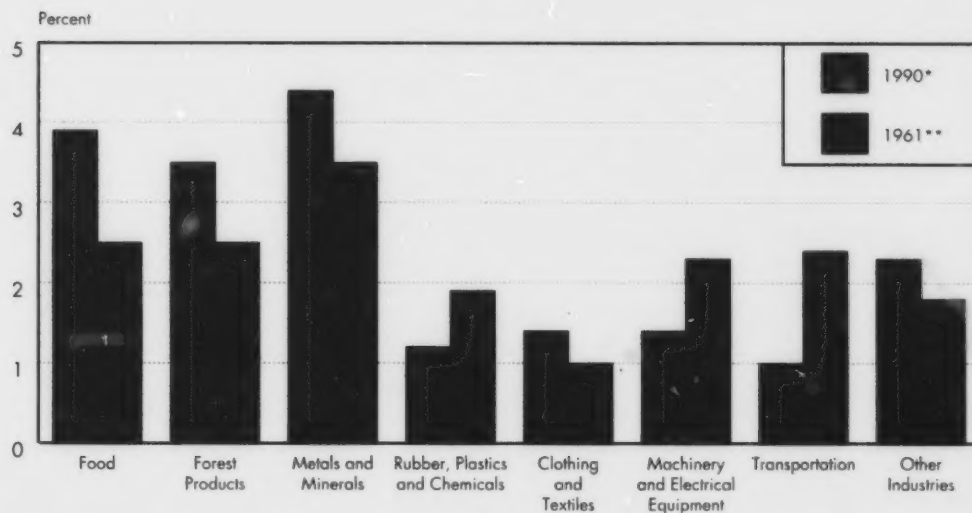


*Pie size difference represents the growth in the economy.

Note: Numbers have been rounded.

Source: Statistics Canada.

CHART 2
MANUFACTURING SHARE OF TOTAL GDP, BY INDUSTRY GROUP
 (Constant Dollars)

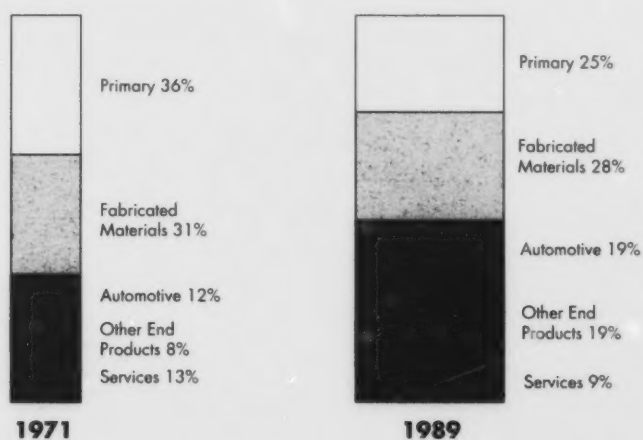


*In 1990, total manufacturing generated 17.9 percent of GDP.

**In 1961, total manufacturing generated 19.1 percent of GDP.

Note: Numbers have been rounded.

CHART 3
CANADIAN EXPORTS BY SECTOR*
 (Constant Dollars)

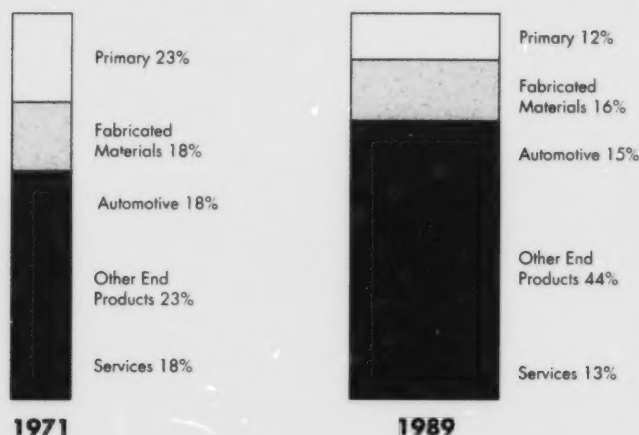


*The difference in the width of the columns represents the growth in exports.

Note: Numbers have been rounded.

Source: Statistics Canada.

CHART 4
CANADIAN IMPORTS BY SECTOR*
(Constant Dollars)



*The difference in the width of the columns represents the growth in imports.
Source: Statistics Canada.

Canada's Structural Problems

Canadians have long recognized the limitations of the small size of our domestic market and have responded by making trade a cornerstone of our economy and prosperity. The small size of our domestic market, in combination with our traditional reliance on low-value-added resource industries and our high dependence on exports to fuel our economic growth, makes Canada particularly vulnerable to changing international trends.

Our domestic market does not, as a rule, allow our firms to grow to world scale (Chart 5). This restricts our ability to produce high-quality goods and services more efficiently and at a lower cost than our competitors. For Canada, efficiencies associated with large size and diversity of activities come from exporting to other markets (Chart 6).³ To circumvent problems associated with our small size, we can produce innovative products for niche markets — products that are less dependent on low costs and efficiencies. In either case, access to world markets is critical to remaining competitive.

³ Export orientation can be measured using either current (nominal) or constant dollar (volume) data. The two measures correspond exactly only in the base year of the constant dollar data. Volume measures are preferable as they adjust for the impact of price movements over time.

The Canada–United States Free Trade Agreement (FTA) is a major step toward reducing the limitations imposed by the size of Canada's market, but it means that competition for market share will intensify.

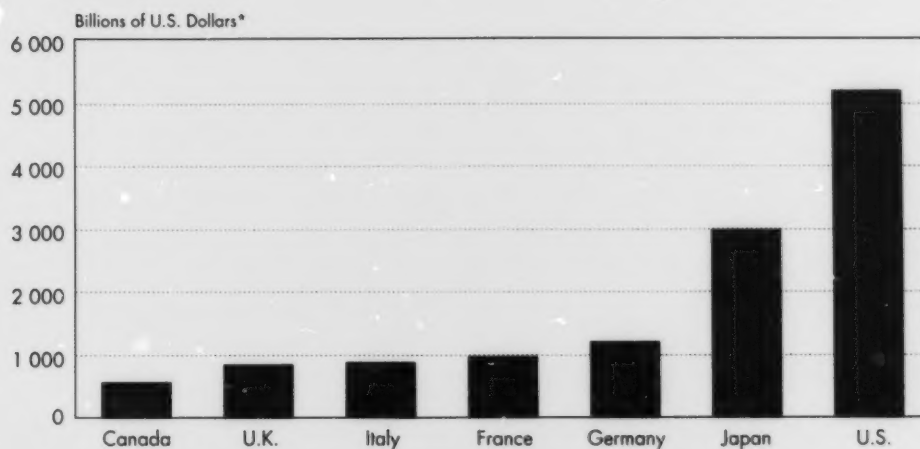
Our Declining Competitiveness

Canada's overall competitive position ranks fifth among the 23 largest industrialized countries according to the 1991 *World Competitiveness Report*.⁴ Our position remains unchanged from 1990 but is down from 1989's fourth-place ranking. Our hold on fifth position is due primarily to the relatively poor performances of countries ranked immediately below us in 1990.

Clearly, the report shows, we have a great number of changes that can be made to improve our competitive standing, changes required to safeguard our high standard of living. According to the report, the bottom line is we are not sufficiently outward or forward looking, or risk or investment oriented.

⁴ The *World Competitiveness Report* is an annual report on competitiveness produced by the World Economic Forum and the International Institute for Management Development, both based in Switzerland. The 1991 Report is the eleventh edition and was published in June 1991.

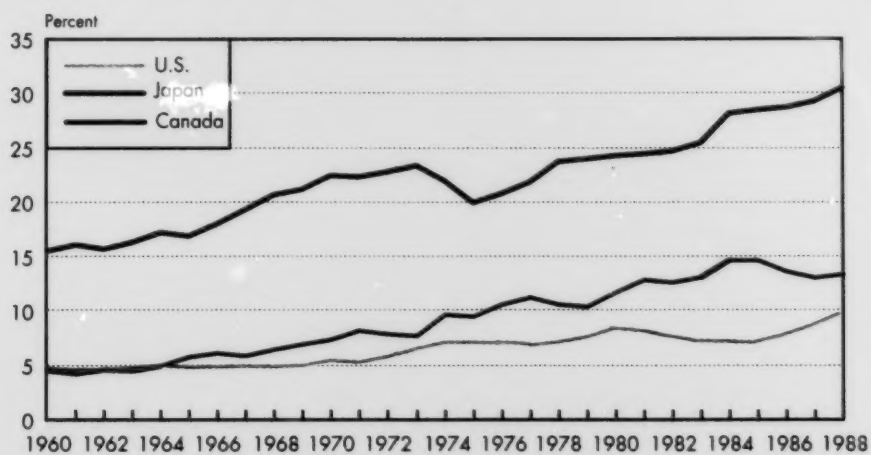
CHART 5
GDP
G-7 COUNTRIES, 1989



*These figures are rounded to the nearest 100 billion.

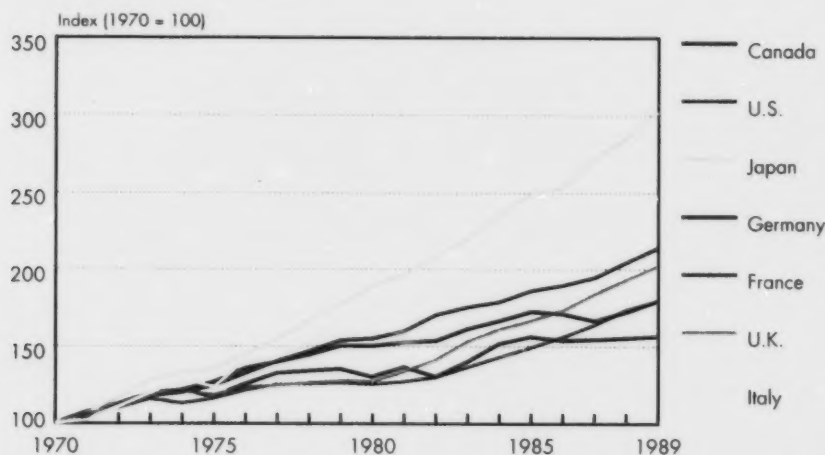
Source: OECD.

CHART 6
EXPORT SHARE OF GDP (VOLUME)
SELECTED G-7 COUNTRIES, 1960 to 1988



Source: OECD.

CHART 7
LABOUR PRODUCTIVITY — MANUFACTURING*
G-7 COUNTRIES



*Output per hour.

Source: U.S. Bureau of Labor Statistics.

The importance of remaining competitive cannot be stressed enough; it is the only guarantee for our continued economic well-being. This is why our recent low productivity growth, coupled with strong domestically generated cost and price pressures, are especially disquieting.

The growth in our manufacturing labour productivity⁵ has been the slowest of the G-7 countries (Chart 7). Our poor productivity growth is allowing our international competitors to catch or surpass us, even though the level of our productivity is still relatively high.

Canada's poor manufacturing productivity growth relative to the U.S., by far our largest trading partner, is not confined to any one industrial sector or even to a closely related group of sectors. Canadian performance has fallen behind in sophisticated high-

productivity-growth areas such as electrical products, basic exporting industries such as paper and allied products, and relatively low-productivity-growth sectors such as petroleum and coal, and furniture (Chart 8). This suggests that solutions to the productivity problem are likely to reside in a broad range of factors rather than in narrow conditions specific to particular industries.

Some industries that have achieved relatively strong productivity growth, such as wood products, have done so through heavy investment, which increases the amount of physical capital available per worker. Yet, productivity increases resulting only from investment are not sufficient. They must be augmented by improvements in productivity that arise from better technology and enhanced labour skills. In this regard our record is not impressive.

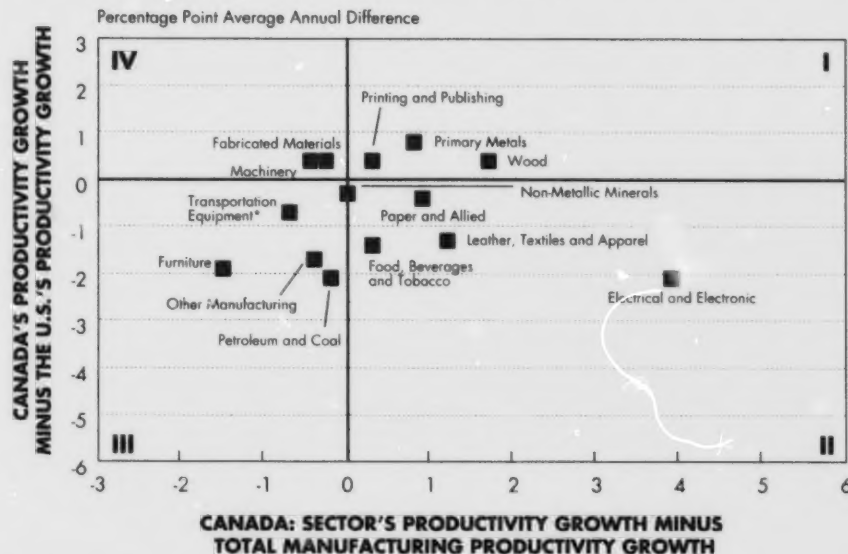
⁵ The productivity measure used in this paper is output per unit of labour, referred to as labour productivity.

Labour productivity is calculated as a composite of total factor productivity (TFP) and the contribution of capital to output. It is, therefore, not concentrated on the efforts of labour alone, but includes changes in technology, training, investment and management. Labour productivity data are readily available and internationally comparable.

TFP is another measure of productivity, used especially when discussing the aggregate economy. TFP measures the efficiency with which labour, capital and materials are used in production; however, it must be estimated rather than measured directly. As with many statistical estimations, there are differences among experts on the appropriate estimation techniques. More importantly, comparable international TFP data are not usually available on an elementary basis.

At the aggregate level of analysis, the two measures tell the same story for Canada, that is, productivity growth slowed dramatically in the 1980s.

CHART 8
CANADA AND U.S. MANUFACTURING
PRODUCTIVITY GROWTH: 1973 to 1987



*Transportation Equipment calculated for 1977-87 period.

Source: S-BID data base of DRI Canada.

Similarly, in order to sustain competitiveness over the long term, real wage gains must track productivity improvements. Countries with strong productivity growth have the scope to increase real wages without reducing competitiveness. In Canada, real wages have grown strongly during the period when productivity increases were weak. As a result, our manufacturing unit labour costs, which measure the cost of labour required to produce a unit of output, have risen considerably faster than those of other G-7 countries, with the exceptions of Italy and France (Chart 9).

Indeed, unit labour costs in a broad selection of Canadian manufacturing sectors have increased faster than in corresponding sectors in the U.S. (Chart 10).

Given the difficulty in keeping our costs in line, it is not surprising that our wholesale prices also rose faster during the 1980s than those of our two most important trading partners, the U.S. and Japan (Chart 11).

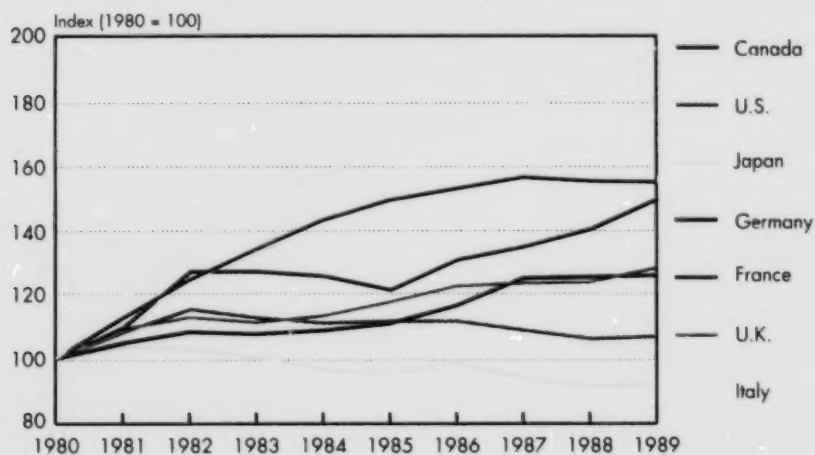
All these indicators tell the same story — we must earn our high wages through productivity improvements so that we can continue to maintain our shared economic and social goals.

The Government of Canada — Setting the Stage for Improved Growth

No single policy can assure our competitiveness. The principal task for the federal government is to get the fundamentals right — something it has been working toward since taking office seven years ago.

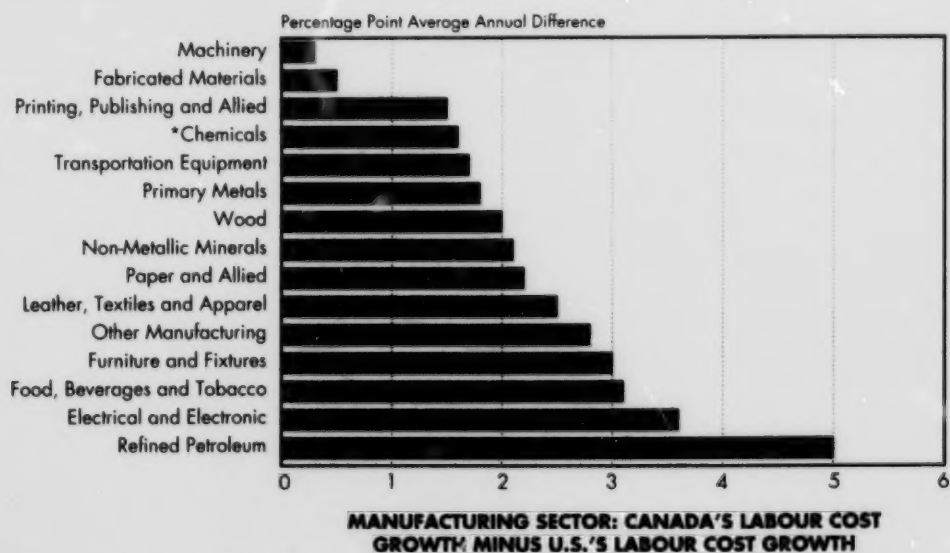
With the introduction of the *Agenda for Economic Renewal* in 1984, and associated policy measures, the federal government set the foundation for a strong, competitive and outward-looking economy. To date, the Government of Canada has gained improved access for Canadians to the world's largest market through the FTA; removed the market distortions caused by the Manufacturers' Sales Tax through tax reform; removed unnecessary restrictions by deregulating areas such as energy and transportation; and improved the balance of private and public-sector activities by privatizing Crown corporations. It is continuing the fight against inflation and the deficit.

CHART 9
UNIT LABOUR COSTS — MANUFACTURING
G-7 COUNTRIES (DOMESTIC CURRENCIES)



Source: U.S. Bureau of Labor Statistics.

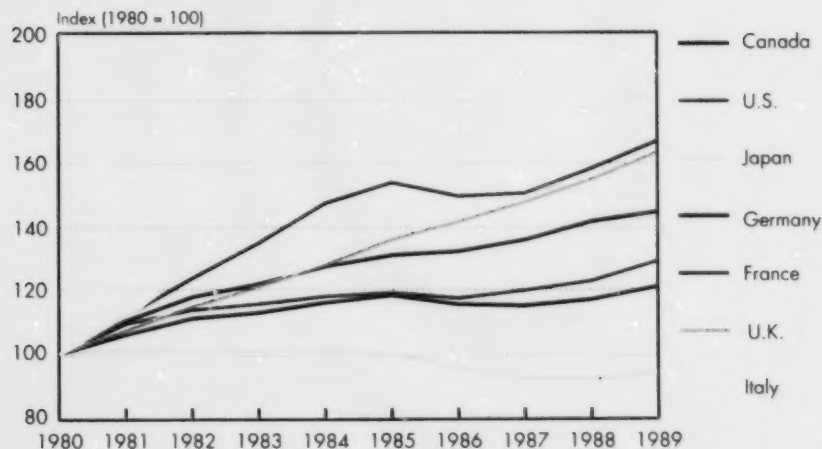
CHART 10
CANADA AND U.S. UNIT LABOUR COST GROWTH
1973 to 1987 (Domestic Currencies)



*Chemicals calculated for 1981 to 1987.

Source: SBID data base of DRI Canada.

CHART 11
WHOLESALE PRICES — MANUFACTURING
G-7 COUNTRIES (DOMESTIC CURRENCIES)



Source: OECD.

Besides measures that improve directly the health of the economy, the federal government is also implementing actions concerning the health of the environment. Through the December 1990 *Green Plan*, the Government of Canada initiated the process of putting the principles of sustainable growth into practice.

Of particular importance to the competitiveness debate, is the international value of our dollar. The international value of our currency is not set by the Government or Bank of Canada, but is determined by market forces. The exchange rate is influenced by private-sector transactions such as trade and capital flows, by government fiscal and monetary policies, and by expectations concerning the economic and political course of the country.

The Canadian dollar has fluctuated substantially against the currencies of our major trading partners (Chart 12). These exchange rate movements have had important short-term implications for business profit margins and our ability to deal with foreign competition. This is especially true for companies and industries that are linked closely to international trade. For example, resource-based companies with sales denominated in U.S. dollars experience a

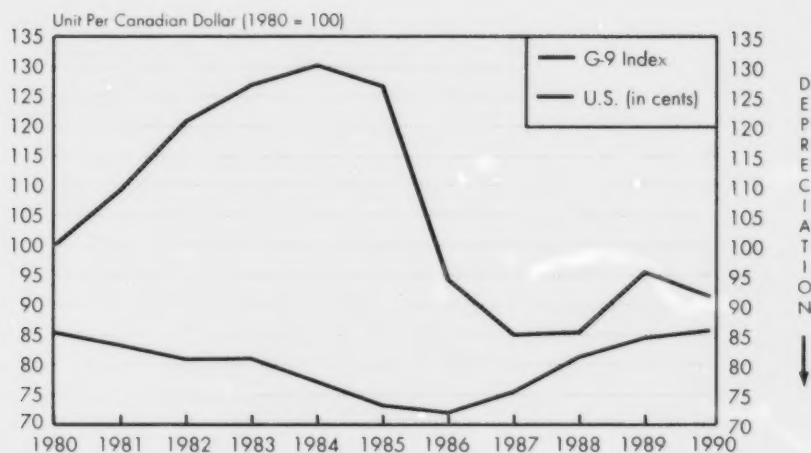
reduction in Canadian dollar profits when the Canadian dollar strengthens relative to the U.S. dollar. Canadian industry has experienced particular difficulty adjusting to the dollar's appreciation since 1986.

Although it is commonly believed the best way to improve our competitiveness would be through currency devaluation, this is not so — currency devaluation is not a panacea for loss of competitiveness. Devaluations do not address the fundamental threats to our competitiveness — poor productivity growth and persistent cost and price inflation — they are but a short-term measure that treats the symptoms of what ails our economy and invites long-term damage to our competitive standing.

Furthermore, a declining dollar adds to inflationary pressures and can result in a lowering of our standard of living, as the terms of trade would move against us. The fight to arrest the general rise in domestic costs and prices would be made harder and longer.

In the long term, a stable, low-inflation environment in which government demands on financial markets are minimized will provide an economic climate most conducive to sustained prosperity.

CHART 12
CANADIAN DOLLAR*



*G-9 countries (excludes U.S.).

Source: Bank of Canada.

The Private Sector — Meeting the Challenge

Our objectives are not just to survive in this world, but to prosper in it; to be winners as a nation and as a people. Neither governments, nor business, nor labour can do this alone. The private sector — both business and labour — and government have a shared interest in a growing and prosperous economy. The federal government's policies have moved the economy forward and now all stakeholders must take up the challenge.

For **business**, competitiveness means stronger and more viable firms, growth in market share and increased profits.

For **labour**, competitiveness means better quality jobs, sounder employment prospects, higher wages and job satisfaction.

For **society**, competitiveness is more than just concern about the economy. It is ultimately a concern about our standard of living and quality of life. A strong and competitive economy affords us the ability to maintain the social services and structures that are now integral parts of our way of life and offer us the wherewithal to tackle new issues, such as the environment.

Building Enhanced Capabilities in Six Key Areas

The quality of Canadian goods and services and the reputation of the Canadian trademark — *Made in Canada* — is the foundation of our ability to compete.

The federal government discussion paper *Prosperity Through Competitiveness* emphasizes that building a strong and competitive Canadian economy will require the cooperation of all stakeholders — business, labour, consumers and government — in a major effort to improve our standing in each of the key factors of competitiveness.

Stakeholders must work together to:

- develop a better educated, higher skilled and adaptable work force;
- promote more effective research, innovation and technological adaption;
- attract and acquire investment capital on reasonable terms;
- promote a competitive domestic environment by reducing unnecessary regulations and encouraging demanding customer attitudes;

- improve access to world markets and take advantage of new opportunities, such as the FTA; and
- promote partnerships among business, labour and governments, as well as among firms.

Human Resources

The 1991 *World Competitiveness Report* ranks Canada 20th out of 23 industrial countries in terms of in-company training and 15th in terms of availability of skilled labour.

Despite having educational systems that are among the most accessible in the world, about one third of our students do not finish high school. There is a greater tendency for a school drop-out to be functionally illiterate and, therefore, largely untrainable and unemployable.

In a competitive economy, the education and training of individuals is a lifelong process. Although Canada spends a high percentage of its GDP on education, important shortcomings exist in the education and training of our work force. As a result, the effectiveness of this investment increasingly is being questioned. What new steps should we all be taking to ensure a well-trained and effective labour force?

The need to educate and train our labour force cannot be overstated. **Over half of the new jobs in this decade will require more than 12 years of education and training; yet some 60 percent of our current work force possesses no more than a high-school education.** Many of these individuals lack the necessary tools for continued education and retraining — fundamental requirements for a dynamic work force.

In response, the federal government is increasing the emphasis placed on education and training; as has been done recently in the area of unemployment insurance, moving from passive income supplementation to active re-education and training (a move from unemployment insurance to *employment insurance*). Improvements also can be made in the formal educational systems, during the entry period into the work force and while in the work force itself.

Formal Educational Systems

The curricula of the formal educational systems are not keeping pace with the new and changing demands of business. For example, many business graduates lack technical capabilities and the understanding of technological innovation. At the

same time, many technical graduates do not possess adequate management and communications skills.

From the Classroom to the Work Force

We lack a well-developed transitional system to teach the skills required for the move from formal education to the work force. Our apprenticeship programs are not up to the standards set by leading countries in this area (e.g. Germany).

On the Job

With the increasing pace of technological change, the skills of the work force must be upgraded more quickly than ever before. Ironically, in Canada, education and training by and large diminishes rapidly upon entry into the work force.

Only 31 percent of Canadian firms provide formal training for their employees, well below that of our major competitors, and much of this training is for management. Of firms in the manufacturing sector, only large companies uniformly offer their employees opportunities to upgrade their skills (Chart 13). Of the companies supporting training, the amount spent per employee in 1987 averaged only \$240 (Chart 14).

Science and Technology

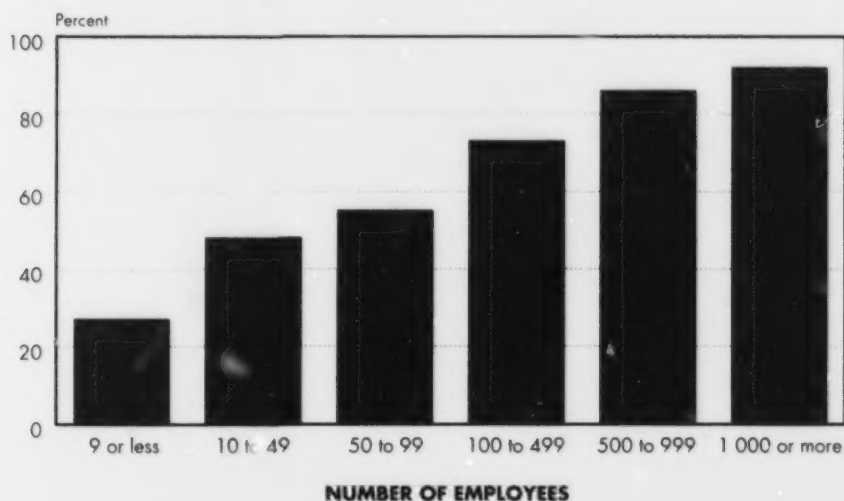
The 1991 *World Competitiveness Report* ranks Canada 17th out of 23 industrial countries in terms of overall S&T attributes.

Within this broad factor of competitiveness, Canada places 15th on R&D expenditures made by business; 19th in terms of patents granted to residents; and 9th in our ability to seek out and exploit new technologies and processes worldwide.

Competitiveness requires that our businesses be on the cutting edge of technology. We must be looking constantly for better ways of doing things as well as for new things to do. Given this imperative, how can industry profitably increase expenditures on R&D and update technological processes that are key investments in their future?

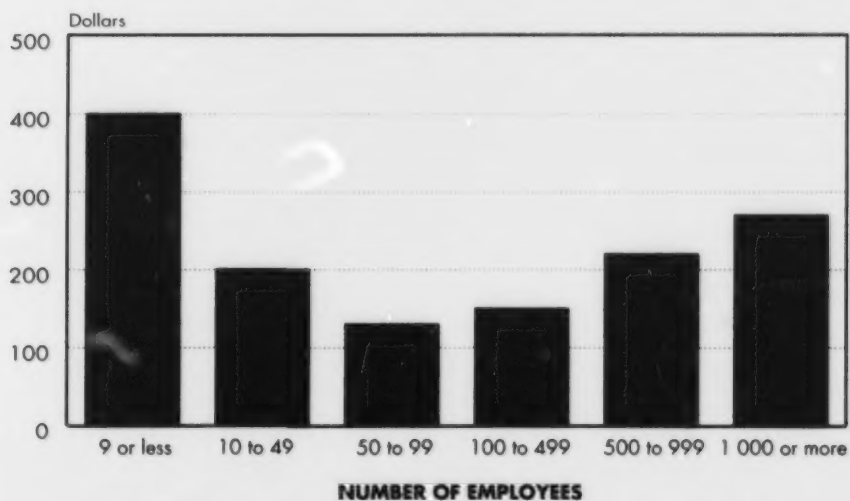
The power of S&T to secure market leadership has been demonstrated clearly by Sweden, Germany and Japan in sectors such as automobiles, machinery and consumer electronics. Investments in S&T are essential to improving productivity because they fund the innovations that lead to better products and services, and the creation of high-quality, high-wage jobs.

CHART 13
PRIVATE SECTOR PROVISION OF TRAINING,
BY COMPANY SIZE, 1987



Source: Statistics Canada.

CHART 14
PRIVATE SECTOR TRAINING EXPENDITURE
PER EMPLOYEE, BY COMPANY SIZE,* 1987



*Employees of companies supporting or providing training.

Source: Statistics Canada.

The record of the Canadian private sector in this area is poor by the standards of our major competitors. R&D expenditures by industry amount to well under 1 percent of GDP and represent only 55 percent of total Canadian R&D. **Of the over 40 000 manufacturing enterprises in this country, only 1 700 carry out R&D** (Chart 15). To gain from worldwide technological advance, Canadian business must both increase its R&D expenditures and incorporate existing new technologies in its products, services and production processes.

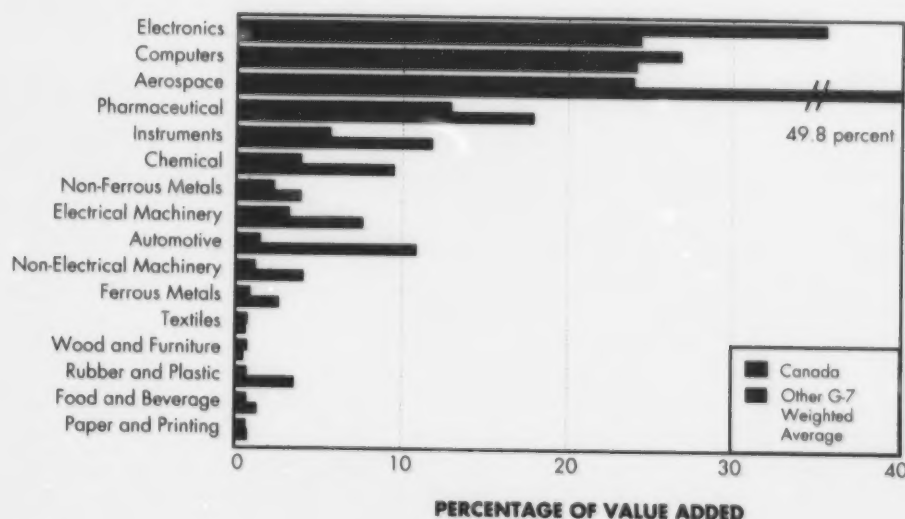
Innovation, however, is more than investing in R&D. At the level of the firm, it also includes the ability to understand and adapt new technologies. Unfortunately, few of our industries have this capability. For example, **Canada has only 4.5 research scientists and engineers per 1 000 members of the work force; Japan has 8.1.** It is not surprising then that a 1989 survey by Statistics Canada shows that less than half of the manufacturing respondents had implemented any of 22 advanced manufacturing technologies (Chart 16).

Financing Investment

The 1991 *World Competitiveness Report* ranks Canada 11th out of 23 industrial countries with respect to financing. Moreover, management's emphasis on long-term strategic decision making, which influences financing considerations, is ranked only 14th. Yet, to be competitive, entrepreneurial activity and risk taking must be encouraged. What can the private sector do to ensure that sufficient capital is available to those who need it?

Canada's international competitiveness depends on maintaining an attractive investment climate and the efficient operation of our capital markets. Although international comparisons are difficult to make, evidence suggests that **both Canada and the U.S. have higher costs of funds compared with their major competitors.** This affects both the type and amount of investment. Companies facing a high cost of funds tend to focus on short-term investments with a quick payback. As a consequence, long-term strategies related to improving productivity performance, lowering costs, developing new products and expanding market share tend to be neglected.

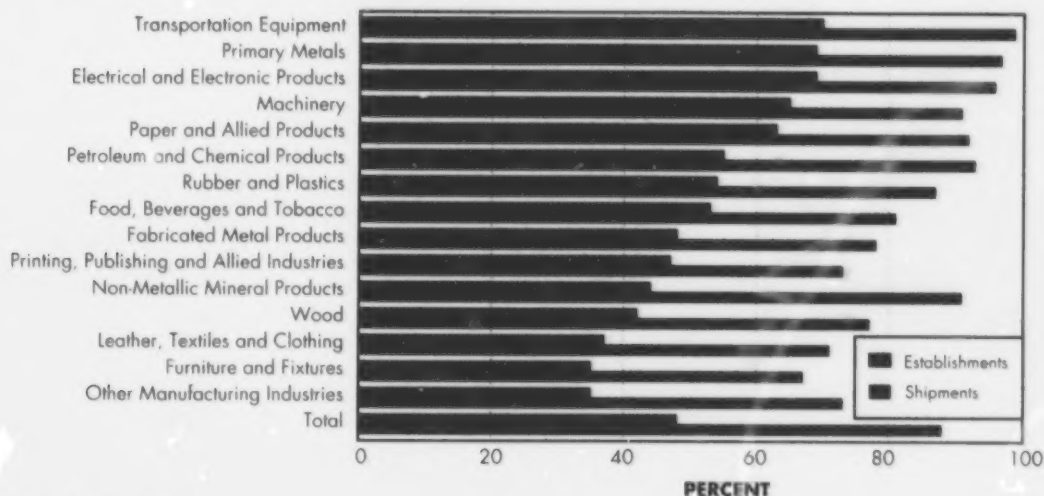
CHART 15
BUSINESS R&D EXPENDITURES, 1987*



* 1987 or latest year available. Sectors presented account for 67 percent of business R&D.

Source: OECD STAN data base.

CHART 16
USE OF AT LEAST ONE ADVANCED MANUFACTURING
TECHNOLOGY, BY INDUSTRY SECTOR, 1989



Source: Statistics Canada.

It has also been observed that many Canadian firms have difficulty acquiring investment capital. This problem is more prevalent among small and medium-sized firms in less traditional industries, such as those in high-technology sectors. Part of the problem appears to be that our **venture capital markets tend to be conservative.**

In spite of these specific problems, Canada's aggregate investment growth has been good. Between 1980 and 1989, Canadian business investment, excluding residential construction, averaged 15.5 percent of GDP, the second highest among G-7 countries. However, this is attributable in large part to strong investment in non-residential construction.

Canada's investment record in machinery and equipment that contains productivity enhancing newer technologies has been relatively poor during the 1980s (Chart 17).

A Competitive Domestic Market

The 1991 *World Competitiveness Report* ranks Canada's governments 10th out of 23 industrial countries in terms of promoting domestic competition.

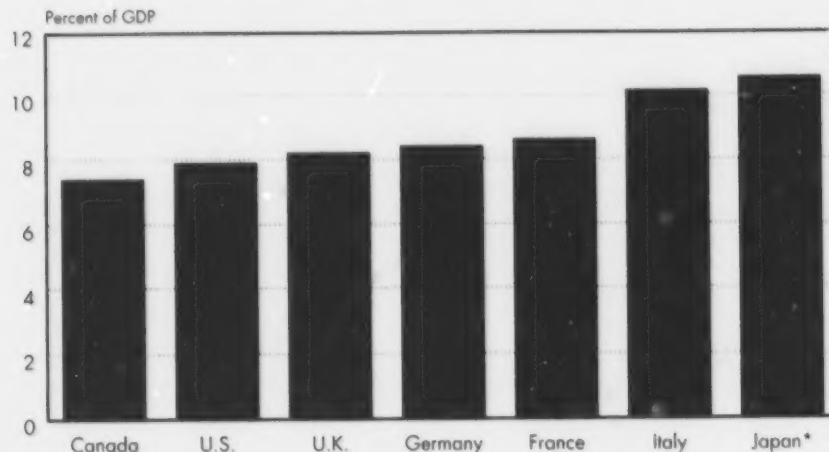
To be competitive internationally, our businesses must be exposed to competition at home. A first step in this direction would be removing interprovincial barriers to trade.

How can business and labour encourage effectively the removal of domestic barriers to competition?

A competitive domestic marketplace fosters entrepreneurial activity and forces business and labour to look continuously for ways to enhance their competitive abilities. The competitiveness of our industry is affected by the structure of our domestic policy framework — competition policy; incorporation and bankruptcy rules; intellectual property rights; regulatory environment; tax structure; and attitudes toward foreign investment. The domestic policy framework must be one that is efficient and conducive to competitiveness. For example, providing strong intellectual-property rights encourages innovation and investment. Protecting innovators creates incentive for investment in new products and processes, with possible spinoffs throughout the economy.

In the area of competition policy, the *Competition Act* of 1986 is a significant modernization of previous standards. Changes include allowing for special treatment of export consortia, joint ventures and firm collaboration — measures that increase the competitiveness of Canadian firms. The Government of Canada continues to examine the appropriateness of corporate concentration in Canada. In addition, it is

CHART 17
BUSINESS INVESTMENT IN MACHINERY
AND EQUIPMENT (1980 to 1989 Average)



*1980 to 1988 for Japan.

Source: OECD.

reviewing areas in the *Canada Business Corporations Act* and the *Bankruptcy Act* — such as shareholder rights, insider trading rules and flexibility for debtors — to ensure that these laws continue to support the competitiveness of Canadian firms. In June 1991, as part of the review of the *Bankruptcy Act*, the federal government tabled amendments in the House of Commons designed to enhance the conditions for risk taking, entrepreneurship and the development of businesses.

An area of significant concern is barriers to free trade between provinces. These barriers influence adversely the way companies develop, how they organize their domestic business and, ultimately, their ability to compete. **A small market such as Canada's cannot afford the fragmentation caused by interprovincial trade barriers.** We need to ensure that our domestic business frameworks and regulatory environment are consistent with the need to compete in the global community.

Trading Relationships

The 1991 *World Competitiveness Report* ranks Canada 16th out of 23 industrial countries in terms of globalization. Our ability to adapt domestic products for export is ranked 15th, and the willingness of our firms to enter into cross-border alliances 10th.

Being competitive, for a small, open economy such as ours, demands that we embrace the opportunities available to us through reduced international barriers.

What further steps can Canadians take to broaden our focus from the domestic marketplace to the global marketplace? Having access to world markets and taking advantage of trade opportunities increases our efficiency, sharpens our ability to compete and creates new avenues for our businesses to develop into world-scale firms.

Efforts to improve market access through the GATT and the FTA have opened doors for Canadian business. Yet, the lowering of trade barriers is simply a first step: in order to realize gains from trade,

industries must expand beyond the domestic marketplace into these new markets. Currently, our industrial base is dominated by small and medium-sized firms that are not export oriented. In fact, **only 100 manufacturing enterprises (out of more than 40 000) account for more than half of our merchandise exports.**

Trading in the global market is very demanding. Firms must acquire a sophisticated understanding of market conditions, barriers and opportunities if they are to realize their potential. Equally, they must be aware of, and have access to, competitive trade financing, such as loans and credits.

Today, the global trading environment is dominated by direct investment capital flows and intra-firm trade. Foreign investment flows, which are growing about three times faster than trade, are a principal agent of global economic integration and a key to technological dissemination. One way Canadian firms, which tend to be small by global standards, could gain access to world technology and intra-firm trade networks is to form direct investment links with firms from other countries.

Recognizing the importance of these issues, the federal government introduced the *Going Global* strategy — a program designed to assist small and medium-sized firms to integrate international trade, S&T and investment activities. In addition, the federal government supports Canadian exporters through its network of trade offices around the world. These initiatives could be augmented by enhanced private-sector efforts — the actions of individual firms and their industry associations.

Most of Canada's gains in international market share in the 1980s were in the U.S. (Chart 18). Our share of the U.S. market increased in virtually all the main manufacturing sectors. In contrast, our share of total U.S. merchandise imports remained stable during the 1980s, although marked declines did occur during the previous decade.

Although Canadian exporters have been successful in competing against U.S. producers, other exporting nations have done even better. **Canada has lost ground vis-à-vis third countries in the U.S. market, even in industries where Canada has a strong comparative advantage.**

Although the FTA increases our trading focus on the U.S., we must compete successfully with others in the U.S. market while forging new links with other areas of the world. Our economic development will be further enhanced by increased trading ties with Mexico, the EC, Asia and Eastern Europe.

Building Partnerships

The 1991 *World Competitiveness Report* ranks Canada 11th, 12th and 13th out of 23 industrial countries in terms overall management, employee turnover and impact on business of labour absenteeism, respectively.

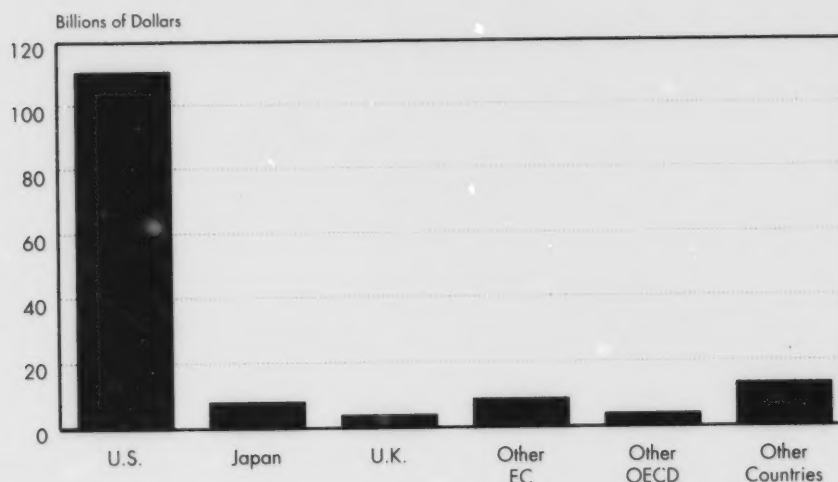
To be competitive, we need to pull together. Success will only be achieved through the partnership of business and labour working together toward a common purpose. Can business and labour give more priority to shared objectives by working together cooperatively?

Success in improving competitiveness can be assured only through cooperative action by business, labour, educators, governments and others. **New partnerships are necessary to respond to the changes in the nature of work, its organization and relationships.**

Competitiveness of industry begins with cooperation at the firm level. Business must look beyond the traditional structures of production and management. Many of today's successful companies, both in Canada and abroad, are employing Total Quality Management to enhance their competitiveness. Improvements in product quality and service are achieved through cooperation within the firm and communication between the firm and its suppliers and customers. This cooperation is more than just positive labour-management relations within the firm. It extends to relations with suppliers and the customers. Competitiveness is enhanced by maintaining open communications among what are quite distinct groups in more traditional enterprises.

Competition among firms is important for the overall functioning of the economy. There are times, however, when cooperation among firms can help to increase their international competitiveness. For example, access to global markets may be denied to a small company, but not to a group of small companies engaged in a joint venture. Strategic alliances, partnerships and joint ventures among firms can be an integral part of remaining competitive.

CHART 18
CANADIAN MERCHANDISE EXPORTS, 1990



Source: Statistics Canada.

Building partnerships also means taking joint responsibility for making the requisite adjustments to improve competitiveness in the dynamic world economy. On the human resource side, business, labour, educators and governments must encourage all labour force participants to acquire new skills. Individuals must be willing not only to accept change, but also to exploit change in order to ensure better jobs and a higher standard of living.

In short, we must strengthen existing partnerships and forge new ones. All stakeholders must realize that it is in their best interest to have a strong and competitive Canada.

Building a National Consensus

The federal government is reaching out to management, labour and all Canadians in all sectors of the economy. It is time to build a national consensus and a plan of action for a competitive Canada.

Competitiveness cannot be imposed by governments. It must be built with the participation and commitment of all stakeholders. This paper and the ensuing consultations provide the opportunity for stakeholders to bring forward their views and advice on Canada's competitive challenges. Our first challenge is to recognize that we all can make improvements in Canada's competitiveness.

For these sectoral consultations to be effective, it is important they be led by the private sector. Business and labour in each industrial sector must begin the process of improving competitiveness by forging the necessary partnerships to address the competitive challenge. Other participants, such as suppliers, customers and academics, can also bring their views on the competitiveness of a specific industry to the debate. The role of the federal government in these sectoral consultations will be as facilitator.

As each industrial sector's situation is unique, it is helpful to review individually their prospects and challenges within the framework just described, as is done in the following chapter.



**SECTORAL COMPETITIVENESS
ASSESSMENTS:
Performance and Prospects**

To assist in fulfilling ISTC's mandate to promote international competitiveness and excellence in Canadian industry, science and technology, the following chapter assesses the competitiveness of 16 major industrial sectors. The sectors are as follows:

- Food and Beverages
- Chemicals
- Forest Products
- Ferrous and Non-Ferrous Metals
- Fabricated Materials
- Industrial Equipment
- Electrical Manufacturing
- Information Technology
- Aerospace and Defence Electronics
- Automotive
- Urban Transit and Rail
- Textiles
- Furniture
- Commercial Services
- Construction
- Tourism

While these major industrial sectors comprise a large number of industries, some of which are highlighted in the analyses to a greater extent than others, there are major areas of the Canadian economy not covered. These areas include important natural resource industries (agriculture, fishing, forestry and mining) and government services.

Each of the sectoral assessments is broken into the following subheadings: **Structure; Performance; Strengths and Weaknesses; Outlook for the 1990s; and A Sectoral Agenda for International Competitiveness.** The agenda sections identify some of the major issues that industry, labour and government, individually or in partnership, need to address in the 1990s to ensure international competitiveness.

THE FOOD AND BEVERAGE SECTOR HAS A SIGNIFICANT PRESENCE ACROSS Canada. It ranks among the top five sectors in shipments, employment and value added, employs 232 000 people and supplies a domestic market worth \$43 billion. While domestically oriented, the sector also runs a modest export surplus thanks to consistently strong performance in the export of fish, pork and distilled spirits.

Structure

The Canadian food and beverage sector can be grouped into six major categories, thereby reflecting relationships between supply bases and positioning on the value-added chain. The first four categories — meat and poultry, seafood and marine products, dairy products and crop-based products — are closely linked to the agricultural and fisheries sectors. Processed commodities typical of these categories, such as fresh meat, fish blocks, fluid milk and flour, while produced in large volumes, have relatively low levels of value-added content. However, all of these industries now strive to add more value where feasible. The remaining two categories, further processed products and beverages, are characterized by much higher levels of value-added content, and contribute almost 60 percent of value added within this sector.

Geographically, most seafood and meat industries, and some crop-based industries, such as oilseed crushing, are located near their sources of raw material, while the dairy, further-processed and beverage industries are clustered near urban mass markets. Fully 47 percent of total value-added food and beverage production is centred in Ontario and another 30 percent is in Quebec. Distinctive, regionally based food-processing industries are found across Canada. These include the important seafood-processing complexes on the east and west coasts; potato processing in New Brunswick, Prince Edward Island, Manitoba and Alberta; fruit processing and wine production in the Annapolis, Niagara and Okanagan areas; and beet sugar refining in Manitoba and Alberta.

Ownership in this sector is mixed and changing. The further-processed category includes numerous foreign-owned multinational enterprises, such as Nestlé and Campbell Soup, as well as many small and medium-sized firms, which are predominately Canadian-owned. Large foreign corporations are increasingly active in the meat and poultry category

(Hillsdown, Cargill and Tyson), and the crop products category (ADM and Central Soya), groupings that until recently were dominated by Canadian firms. The seafood products and dairy industries ownership, however, tends to be concentrated in large Canadian companies (National Sea, Fishery Products International, Agro-Pur and Ault). Concentration levels in the sector are increasing as part of a sustained rationalization and specialization process. Rationalization on the Atlantic coast, however, is proceeding at a much slower rate, reflecting the dependency of many single-industry communities on smaller processors.

Canadian food and beverage processing industries represent the major market for Canada's 290 000 farmers and 100 000 fish harvesters, purchasing \$22 and \$3 billion respectively in crops, livestock and fish each year. By comparison, Canada annually exports approximately \$10.5 billion of raw food commodities, primarily wheat and seafood products, and \$5.5 billion of processed foods.

The food and beverage sector annually converts \$12 billion of domestic inputs, together with \$7 billion of raw-food imports, such as cane sugar, tropical products and soya meal, into processed foods and beverages worth over \$42 billion. Approximately \$5 billion of processed products are imported, primarily from the U.S. The sector relies on a highly concentrated and increasingly demanding retailing sector to distribute and market its output in Canada.

The food and beverage sector exports 10 to 15 percent of its output, and imports 10 to 12 percent of its inputs, mostly cane sugar, coffee, tea and tropical products. These overall figures mask the fact that only selected industries are highly export oriented, notably fish (85 percent), pork (22 percent), distilled spirits (49 percent) and vegetable oils (24 percent). Since the 1970s, the U.S. has remained Canada's most important trading partner for this sector, while Japan has replaced the EC as Canada's second most important export market for food.

Performance

Although Canada's food and beverage sector enjoyed steady growth from the 1960s to the early 1980s, labour productivity (which had improved slowly compared with the U.S.) began to falter in the mid 1970s and has not recovered. After the 1960s, there were several shocks to the sector, most notably the commodity price surges in 1973-75, the 1980 U.S. grain embargo to the U.S.S.R., and the U.S.-EC grain export subsidy wars of the late 1980s.

During the 1980s, the productivity of the U.S. food industry, Canada's main competitor, improved significantly compared with Canada's due to extensive rationalization and considerable investment in world-scale plants. These plants, often located in states with lower-wage structures, helped to neutralize Canada's 10 percent labour-cost advantage during the 1980s. Other U.S. competitive advantages resulting from vertical integration, linkages to national distribution systems, and economies of scale encouraged the migration from Canada to the U.S. of further-processing activity, such as fish and beef. Cross-border shopping by Canadians for dairy, poultry and other food products reflected perceived food-price advantages in the U.S.

Profitability

Profitability performance within the sector was mixed with relatively steady rates of return in industries such as dairy, further-processed products and alcoholic beverages, and sometimes wild fluctuations in cyclical industries such as meat processing and fisheries. Since 1980, the fish-processing industry experienced two cycles of price and profit collapse (1981-83 and 1989-90), as did the red meat industry (1983-84 and 1989-90). Both periods were marked by extensive rationalization of these industries.

Overall, sector profitability (return on assets) paralleled that of the manufacturing sector. Some firms ran down their assets rather than reinvest them, particularly those firms operating in industries where there is substantial overcapacity, such as the fish, red-meats, oilseed-crushing and flour industries. These industries, which have been experiencing prolonged operating losses due to low processing margins, have been virtually unable to finance major new production facilities.

International Competitiveness

Growth rates in domestic demand for food tapered off in the 1980s, but the sector appeared to perform adequately, clearly limiting import penetration even for low-tariff food products. The sector also maintained traditional shares of key export markets for fish, meat, malt and distilled spirits throughout the 1970s, but began to show weaker export performance during the last decade. While the sector maintained its export performance in absolute terms, its relative performance during the 1980s deteriorated in terms of Canada's share of growing world export markets. The sector emerged from the 1980s still reliant on the export of low value-added processed commodities. The U.S. and Japan also remained its two main export markets in spite of efforts to diversify into new markets.

The 1990s present tough challenges for the Canadian food and beverages sector. The immediate consequences of the FTA have resulted in multinational enterprises repositioning themselves, making investment decisions with the best available knowledge they possess and, if they decide to stay in Canada, looking at all means of acquiring scale and maximizing the use of existing capacity to enhance competitiveness in North American and world markets.

Opportunities do exist. With some exceptions in the seafood industry, where several fish stocks are temporarily depleted, the sector retains a solid resource base that can reliably supply high-quality raw materials. These are transformed into a wide range of value-added products, some of which will continue to experience strong export demand (e.g. seafood products, low-fat meats, engineered or functional foods, and specialty foods). The processing sector has the potential for flexible and specialized product runs that are well-suited to niche markets in North America, Japan, Europe and Oceania.

The strategic entry of large American and European firms into several of the Canadian primary food industries reinforces the belief that important industries within the sector are experiencing a *paradigm shift* from dependence on domestic markets. Global marketing is the new reality. These industries, based on supplies of high-quality raw materials such as wheat, canola, cattle and hogs, have substantial room for growth, particularly in value-added products exported through the multinationals' trading networks. Such a development, however, hinges on the success of the Uruguay Round in limiting trade-distorting

subsidies to agriculture. Unless this is achieved, intrinsic raw-material competitiveness will have little relevance in the world marketplace for processed products.

Judging the international competitiveness of many of Canada's food and beverage industries is difficult because of serious distortions in the trade flows attributable to export subsidies used by international competitors. It is increasingly clear, however, that the productivity of key Canadian food industries has been compromised by Canada's own policies aimed at maintaining regional production bases for some basic food products.

Strengths and Weaknesses

The Global Environment

An understanding of the food and beverages sector's performance requires a brief review of the changing global competitive environment and a consideration of the more important factors that determined the sector's performance. The sector experienced increasing international competition throughout the 1970s and 1980s, first in export markets, where it was challenged by a resurgent Europe, and then in the domestic market, where potential and real import threats from other nations have become more significant since 1985.

The emergence of the EC led to fundamental shifts in world trade patterns for food commodities. The Common Agricultural Policy drove Western Europe, a formerly significant importer of food from Canada, to achieve self-sufficiency in most types of food products and to become an aggressive exporter of grains and primary processed foods. The resulting EC food surpluses, exported with state subsidies, forced commercial exporters such as Canada out of many export markets for flour, malt, dairy products and pork. Britain's accession to the EC in 1973 also resulted in the loss of a major market for Canada's processed-food exporters, and diverted some competing Australian and New Zealand products to Canada's domestic and major export markets.

Since 1985, aggressive U.S. reactions to EC incursions into traditional American export markets have led to the current price collapse for numerous agri-products of interest to Canada. Canada, along with other free traders, has suffered the income-reducing effects of competing U.S. and EC subsidies on basic

foods such as flour and vegetable oils. This situation appears likely to continue, pending the settlement of effective GATT subsidy disciplines. Furthermore, Canada's ability to protect its domestic market and manage resources, such as fish stocks, was also threatened by the outcomes of several recent panel rulings under the GATT and the FTA, including those on alcoholic beverages, ice cream and yogurt, lobsters, salmon and herring. It is worth noting, however, that a number of recent panels, such as the GATT and the FTA panels on the U.S. countervail on pork, have ruled in Canada's favour.

More positive developments included the Tokyo Round liberalization of trade in processed-food products; new demand for food products from an increasingly resilient Japan; the initial surge in available fish supplies in the new 200 nautical-mile economic zone around Canada's coast (1977); and significant growth in food-aid shipments such as flour, skim-milk powder and canola oil.

International Competition

The isolation of domestic markets in the 1970s and early 1980s minimized the impact of increasingly globalized trade competition. However, this isolation was abruptly ended with the implementation of the FTA, which increased awareness of differences between the Canadian and U.S. industries in terms of their structure and basic competitiveness.

The competitiveness factors at play during the 1970s and 1980s were numerous, and their effects on key stakeholders — suppliers of inputs, the primary sectors (farming and fishing), commodity processors, the high-value product manufacturers and consumers — were complex. Key factors included linkages with suppliers, R&D, industry structure and orientation, corporate strategies, investment and market access, supply management, interprovincial barriers, production cost, changing consumer demand, strategic alliances, innovation and human resources.

Canada's farmers, fish harvesters and food processors have excellent access to international suppliers of inputs such as farm supplies, food processing technologies and ingredients. However, the prices of these inputs are not always as low as in other competing countries, due in some instances to Canada's substantially higher quality standards. Increasing supplier concentration may also lead to higher costs for even standard technologies sourced from outside of Canada.

A trend to more *in-house* development of processing technologies may restrict or delay access to new technologies, particularly when the developer is also a large processor, when the developer is closely tied to a *national* enterprise such as the automated meat plant project in Australia, or where the innovation has patent or trade-secret protection (functional foods such as Aspartame). Canada has only limited capabilities as far as domestically based technology suppliers are concerned, and could be increasingly cut off from key technology advances.

Research and Development

Basic, food-related R&D, as well as technology transfer networks, have received considerable government support, but these efforts have been directed mainly at the primary production sectors. This R&D emphasis on commodity production rather than high value-added product development contributes to the fact that Canada's core strength in food production is in relatively low value-added commodities. Within the food and beverages sector, R&D concentrates on refining existing products rather than on new product or process development.

This R&D bias reflects the historic needs of regional primary industries: the Atlantic and Pacific seafood industries, the central Canada dairy complex, the prairie grain and cattle complex, and several centres of concentrated fruit and vegetable production. Advances in primary-sector technologies have led to the introduction of new crops and production methods, for example, grain corn, canola, intensive livestock production and, most recently, intensive aquaculture.

While R&D efforts in all these areas paid off handsomely in production efficiencies, the processed food and beverage industries often lagged behind, with the lowest R&D levels of any of Canada's manufacturing sectors (0.2 percent of sales versus 1.5 percent for Canadian manufacturing as a whole). Foreign-owned companies, primarily those with strong brand positions, out-perform Canadian firms (0.7 percent of sales as opposed to 0.1 percent). In addition, Canada's efforts in developing innovative food-processing technologies have been extremely limited, and restricted in large part, to adapting foreign developments for use under Canadian conditions. Inadequate investment in R&D is most obvious in the seafood-processing industry, where R&D has

been less than 0.1 percent of sales. The overall rate for the U.S. food and beverages sector is much better at 0.4 percent, but shows that R&D intensity in the North American food and beverages sector is low at a time when Japanese and European competitors are increasing sector R&D.

Industry Structure and Orientation

As Canada's value-added industries co-evolved with the primary sectors upon which they depended, two distinct orientations appeared among the food processing subsectors: some looked inward toward domestic markets, others looked outward toward export markets. Many of the inward-looking industries had significant tariff protection, with import controls added in support of the dairy and poultry supply-management systems. Other major primary processing sectors remained outward-oriented, reflecting their basic competitive advantages, attitudes developed through exposure to trade realities, and a strengthened ability to add value. These industries include red meats, canola and, above all, seafood products.

The corporate structure of the food and beverages sector often influenced the growth prospects of the various industries. The sector's value-added industries, historically those with the highest levels of tariff protection, remain dominated by the *classical* food-sector multinationals with strengths in brand-name products, often sold worldwide. Examples include Kraft-General Foods, Kellogg's, Nabisco and Nestlé. Such companies have long been established in Canada, and have concentrated on the national market. The perishable-commodity food industries were usually owned by Canadian interests, largely because of market realities (such as limited shelf life) and regulations (such as those restricting access to fish supplies to Canadian-owned processors). The most important of these industries were seafood, meat and poultry, bakeries, and the dairies — the latter noted for the strong presence of successful processor cooperatives.

Corporate Strategies

Since 1985, it has become apparent that commodity-based industries are no longer the private preserve of Canadians. Foreign companies with strong roots in worldwide commodity trading networks and primary-commodity processing have been taking strategic positions in Canadian food industries to gain access

to resources or existing market channels. Examples include Hillside Holdings (fish, meat, poultry and flour), Cargill (beef), Tyson (poultry), Central Soya (oilseed crushing and edible-oil refining), and ADM Ltd. (oilseed crushing, flour and malt). These companies have been instrumental in driving fundamental rationalizations of key primary processing industries in Canada. Meanwhile, the long-established food multinational enterprises are retrenching as part of continental and worldwide rationalization programs.

Investment and Market Access

Canadian food and beverage companies have not stood idle as competition advanced into their market. Several made strategic acquisitions to ensure access to American and European markets and product developments. Examples include Labatt's and Molson's (in Europe and the U.S.), McCain's (in the U.S., Europe and Australia), Culinar (in the U.S.) and Canada Malting (in the U.S. and the U.K.). The dairy, poultry and fish-processing industries remain largely isolated from trade pressures and/or direct involvement by foreign investors.

Supply Management

Canada's food and beverages sector reflects the fundamental split in the market orientation of the primary industries to which it is intimately linked. One side, dominated by the red-meat industry and representing roughly 60 percent of total output, is outward-oriented, fighting its foreign competitors at home and abroad for market share. The other side, dominated by the supply and resource management-oriented industries, is realizing that Canada's ability to maintain market stability through complex regulatory regimes is under pressure. The roots of this pressure are domestic market factors; cost-of-production factors; increasing trade liberalization pressures as GATT's Uruguay Round concludes, and a NAFTA looms; and intensifying international competition.

Supply management, as a national policy in Canada, has brought stability to the dairy and poultry industries at the farm, processor and consumer levels. In some cases, it has also imposed a degree of administrative rigidity and a lack of responsiveness to rapidly changing markets, thereby restricting processors in their efforts to evolve into more competitive firms. While the dairy and poultry industries account for almost 25 percent of the food sector's output, their

proportionate shares of the total Canadian market lag behind those of their counterparts in the U.S. market. This foregone market share is due in part to *cost-of-production pricing* of their basic raw materials; absence of direct influence to increase raw product availabilities for major market promotions or new product development; and an inability to rationalize on a national basis to achieve economies of scale. The outcome of the 1989 GATT panel on Canada's right to invoke Article XI: 2 (C) (i) (import protection for ice cream and yogurt) heightened the potential vulnerability of Canada's dairy processors to U.S. competition.

Interprovincial Barriers

An increase in market-sensitive supply management, market regulation and resource-sharing regimes could offset in large measure the adverse economic effects of sub-optimal scale plants, geographically dispersed production facilities and balkanized markets. In Canada, these effects are seen in the seafood industry, which nonetheless remains 85 percent export-oriented, as well as in the dairy, poultry and brewing industries and, to a lesser extent, any industry where administered prices and markets require the implementation of interprovincial barriers to trade. Such barriers impose significant costs beyond those expected in a free market. These costs are attributed to duplication, smaller plants, lack of integration, expensive distribution systems and high administrative overheads.

Cost of Production

Probably the most important characteristic of firms serving closed markets is their high-cost structure compared with their international competitors. Two direct and early consequences of these higher costs is the abandonment of any significant efforts by the supply-managed industries to export (other than for surplus-disposal purposes), and a demonstrably lower level of innovation compared with their U.S. open market counterparts.

Most of these industries will remain isolated from global challenges as long as import controls are in place, but the same cannot be said for those high value-added industries using their output in further-processed products. Highly value-added products are protected from cheaper imports by tariffs, which are declining under the FTA. Import penetration,

encouraged by declining tariffs, will cause a steady erosion of domestic market share for value-added products — unless key input-costs are lowered to match those in the U.S. For example, many Canadian baked goods were not competitive until domestic wheat-price policies were changed. Until these changes, Canadian millers had paid up to twice as much for their wheat as did U.S. millers located a few hours drive from Canada's heartland.

Changing Consumer Demand

As mass markets evolved into numerous lifestyle, ethnic and convenience niche markets during the 1980s, shifting consumer preferences greatly complicated the marketing of food and beverage products. Coupled with these changes are those related to new environmental laws, specifically the National Packaging Protocol. While these developments mean opportunities for adaptable firms, the highly-regulated environment in which the sector operates, both domestically and internationally, makes it difficult for small and medium-sized enterprises to produce a wide range of products cost-effectively. Internationally, consumer-driven concerns about food safety, nutrition and the environment are leading to new regulations on product and process standards, labelling and packaging. These regulations challenge firms to make the most efficient, competitive investments. In spite of intensive efforts, international harmonization of standards is still a long way from being achieved.

Strategic Alliances

Because of the split in the sector between inward and outward focus, inter-sectoral and inter-industry strategic cooperation on competitiveness issues has been minimal. In comparison with the U.S. and other competitors, the Canadian food industry has only begun to develop the degree of strategic purpose needed for coherent and sustained export development and market maintenance efforts.

Innovation

As a result of this lack of strategic purpose, and also because of internal fragmentation and branch plant domination, the Canadian food and beverages sector, with some admirable exceptions, has also not been particularly adept at innovation. Our value-added industries remain underdeveloped, even though world

trade in their products is growing rapidly. However, the distributing and retailing component of the industry — an increasingly important factor in the evolution of the Canadian food and beverages sector — has been somewhat more innovative. New organizational structures and practices (such as electronic data interchange and direct product-profit analysis) have increasingly driven innovation amongst Canadian processors. This is reflected in the rapid sales growth of products developed to the specifications of the major retailers.

The food service sector has also been a driver of processor innovation, demanding tightly specified, portion-controlled products and creating new opportunities for value-added production. This sector also encouraged its suppliers to adopt new production standards, such as Total Quality Management and Just-In-Time inventory systems.

Innovation within the food and beverages sector may be hindered by corporate managers not emphasizing product and process development. This lack of innovation results in the small size and scope of Canadian-owned firms, and the tendency of foreign-owned firms to develop innovations close to their head office. The sector's corporate culture, which reflects its human resource base, favours adapting existing products, processes and business methods rather than innovation.

Human Resources

Human resource issues, particularly training and development, are central to the sector's productivity performance. The sector has historically served as a major entry point for immigrants and rural Canadians into the industrial work force. Because these groups still constitute an important component of the work force that is available to this sector (at a time when it is facing the prospect of major technological changes), education levels and literacy and numeracy capabilities remain key issues. Worker safety and occupational health hazards, particularly repetitive trauma disorders, together with management-of-technology issues in general, are increasingly being addressed cooperatively by labour and management.

Outlook for the 1990s

Despite the sector's structural problems, which, with collective will, can be overcome, the outlook for the food and beverage industry is positive if the momentum toward trade liberalization is sustained, depletion of renewable resources (such as fish stocks) is overcome, and numerous management, technology and human resource issues are resolved. The sector is in a state of flux. The inexorable trade forces of the FTA, MTN, and *Europe 1992*, as well as the prospect of a NAFTA, are shaping Canada's primary industries and their dependent processing industries.

Canada's long-term competitive advantage depends, in large part, on politico-economic developments worldwide. The subsidized EC food exports and U.S. countermeasures that plague efficient industries (such as Canada's meat and grain-products industries) could ease as the world grapples with feeding the Soviet Union and other Eastern European nations, and as negotiations in the GATT continue. Furthermore, the extreme environmental costs of intensive agriculture in Western Europe may also undermine the international competitiveness of the European food industry.

Similar dilemmas face commercial food production in the Far East. Japan, Korea and Taiwan are importing increasing quantities of feed grains, and once world grain markets rebound from their current lows, higher prices will limit these countries' ability to maintain affordable protein production. Asian demand for processed fish, meat, dairy products and an increasingly diverse range of processed foods, is expected to drive the growth of the world's trade in food.

Tapping into this potentially vast market growth requires the following: development of industry partnerships to harness the sector's latent capacity; quality raw materials; a highly flexible industrial base; a solid research infrastructure within Agriculture Canada and the Department of Fisheries and Oceans; new production tools based on biotechnology; and people within the industry who are capable of capitalizing on these assets. ISTC's industry-government sector competitiveness initiatives, such as the Fisheries Products Sector Campaign, the Wine Market Development Program and the Advanced Technologies for the Canadian Meat Industry committee, are encouraging the formation of such

partnerships in human resource development, technology transfer and mechanisms for international marketing.

Progress toward a more internationally competitive food and beverages sector is seen in the recent opening of the Canadian border to U.S. wheat and flour products, the move to daily pricing of wheat, a more open spirit of inter-sectoral cooperation, as represented by the successful contract negotiations between growers and processors in the Ontario vegetable-processing industry, and the ongoing rationalization of several key industries. The directions for the sector's future are set out in the recommendations of the various task forces of the Agricultural Policy Review, and will be refined by the Agri-Food Competitiveness Council, established in July 1991.

A Sectoral Agenda for International Competitiveness

Canada's food and beverages sector can benefit from the strong growth in world trade in processed foods expected in the 1990s, provided that all participants in the sector, whatever their level in the production and marketing chain, adopt a global attitude and recognize their complementary roles.

Where appropriate, individual industries, in partnership with government, could put greater emphasis on developing linkages with equipment and technology suppliers through consortia, joint ventures and technology alliances.

A similar joint emphasis on R&D networks, especially technology brokerage networks, would maximize the use of existing infrastructure. A better balance in R&D throughout the food chain, through reallocation of resources among research centres that emphasize value-added foods, could be achieved by using industry-led R&D consortia, and networks such as Technomar and the International Centre for Agri-Food Science and Technology.

Canadian companies successfully investing equity in foreign markets to gain access for, and acceptance of, their brands outside of Canada, or investing equity to ensure early access to new product and process developments, can serve as models of how to respond to global opportunities. These successful companies could be publicized as case studies to emphasize the strategic lessons of such strategies.

A broad coalition of industry and consumer stakeholders, together with the federal government and the provinces, should build upon the work of the Agricultural Policy Review task forces, which identified a need to develop the *second generation* supply management systems for dairy and poultry. These systems should be sufficiently market-responsive as to be capable of addressing further processor input cost/efficiency issues and product availability/innovation issues.

In a closely related initiative, concerned industries and governments should strive together to significantly reduce all interprovincial barriers to trade in food and beverage products, most notably in beer and wine.

Competition and resource management policies should be reviewed by all stakeholders to ensure that they are responsive to the new competitive realities of the North American market.

Industry, with appropriate support, should experiment with generic marketing mechanisms and pursue identified niche markets in a strategic manner designed to gain global presence for Canadian food and beverage products.

All stakeholders should ensure that their approaches to the environmental issues impacting the sector are balanced, and that the full range of regulatory and market factors are taken into consideration so that the sector's competitive position is not compromised.

Smaller, innovative firms should be encouraged to be more outward-oriented through industry association export-promotion programs, export clubs and participation in industry-led *Competitive Challenge* missions that promote understanding of foreign competitors' strategies and capabilities.

Industry and labour should work closely with government to adopt a coordinated and coherent approach to reduce the costs of inputs (raw materials, packaging, etc.) through regulatory reform, trade liberalization and technology diffusion, and work to increase value-added processing.

Industry, in partnership with government and labour, should foster innovative approaches to developing the sector's human resources through training programs emphasizing Total Quality Management type approaches to production and marketing.

Canada's food and beverages sector faces the challenge of operating profitably in an increasingly open marketplace. Industries that rely on the domestic market will have to cope with increasing competition from American, European and Japanese processors, as well as the global procurement practices of the food and beverages distribution sector. Canadian firms in this sector, if they are to flourish, must match their international competitors' marketing strategies, technologies and products.

THE CHEMICAL SECTOR IS A VITAL PART OF THE CANADIAN ECONOMY, PROVIDING a wide range of technology-based products to the manufacturing industries. The sector is based on competitively available natural resources, such as oil, gas, energy and minerals. Canada's highly educated work force, established distribution and telecommunications systems, and proximity to major U.S. markets are important positive factors, and our access to technology from around the world through engineering firms and international linkages ensures that this sector will remain important to the Canadian economy.

The chemical sector is Canada's fifth-largest manufacturing unit in relation to value of shipments, and ranks third in value added. More than 100 000 people are employed in the sector, and shipments exceed \$20 billion per year. This represents about 10 percent of total manufacturing activity and 5.4 percent of manufacturing employment in Canada. Its markets are international, with exports accounting for 40 percent of shipments.

The trade balance has been positive for five of the past six years, averaging about \$600 million per year. Imports represent one third of the domestic market, and are mostly specialty and formulated chemical products tailored for specific end uses. Exports are world-competitive and are largely commodity chemical products based on plentiful raw materials.

Structure

For purposes of this discussion, the sector is divided into two groupings: commodity products and specialty and formulated products. Commodity products, about 40 percent of sector shipments, are characterized in Canada as world-scale, export-oriented, and capital-intensive, utilizing latest-technology and largely foreign-owned facilities. The positive trade balance for these products has been about \$2.6 billion annually over the past six years. Specialty and formulated products, about 60 percent of sector shipments, are characterized as small-scale operations that supply regions within the domestic market with high-value-added products. These companies have higher Canadian ownership than the commodity sector, and attempt to differentiate themselves from their competition by the quality of service offered.

The negative trade balance has averaged about \$2 billion annually over the past six years, and the import market share has increased.

Commodity products include petrochemicals, inorganic chemicals, resins (plastics), elastomers (rubber) and fertilizers. Specialty and formulated chemical products include specialty and fine chemicals, pharmaceuticals and medicines, paints and varnishes, soaps and cleaning compounds, crop protection chemicals and a wide variety of formulated products.

In total, Canadian chemical sector sales are about 7 percent of North American sales and 2 percent of world sales. The U.S. is Canada's largest trading partner, taking about 70 percent of exports and providing about 70 percent of Canadian imports. Canada is the world's largest exporter of merchant sulphur, the largest exporter of potash, and a significant North American presence in a wide range of other commodity products. We are not a world force in the specialty and formulated industries. For the chemical sector as a whole, prices are set externally; our competitiveness is determined by our ability to meet global prices while ensuring adequate return on investment.

Multinational firms control a major part of the sector — about 75 percent of assets and sales. Related plants of these corporations and large multinationals in other industrialized countries are major competitors. More recently, there have been new entries from other energy-rich (e.g. Saudi Arabia) and newly industrialized countries (e.g. Korea and Taiwan).

The infrastructure available in Canada (educated people, and well-established distribution and telecommunications systems) makes the chemical sector a highly desirable growth industry.

Performance

The chemical sector in Canada developed behind high tariff walls as a domestic-oriented, small-scale industry. As economies of scale improved, and shipment of products was facilitated by transportation advances (bulk carriers and unit trains), international movement of commodities became more common worldwide. It became evident by the mid 1960s that a world-scale, world-market mind-set would be necessary to ensure Canada's long-term competitiveness. In the 1970s and early 1980s, the petrochemical, fertilizer and inorganic industries invested heavily in Canada with an eye to exports. Canada already had most of the essential ingredients for developing these industries (raw materials, electrical energy and a trained labour force). In particular, petrochemical investment was achieved based on security of supply of natural gas and oil feedstocks, and an expectation of a long-term cost advantage for feedstocks following the oil price shocks of 1973 and 1979. In manufactured chemicals, exports grew from 17 percent of sales in 1969 to 43 percent of sales in 1990. Most investment decisions today are based heavily on the export market.

During the 1980s, a recession and the worldwide overbuilding of the previous decade led to a major restructuring of the world chemical industry. In many instances, the overbuilding was premised on feedstock cost expectations that disappeared as the world experienced energy cost escalations and supply difficulties. Most leading world producers rationalized their operations to concentrate on core businesses; the non-core businesses that could not be sold were closed. There was increasing recognition that the remaining business should be operated globally to maximize returns.

For the specialty and formulated industries, performance has been mixed. While growth continues to slightly outpace the national average, these industries are generally characterized by higher import penetration and little export orientation. With the FTA and more open international trade resulting from successive GATT negotiations, these industries are becoming increasingly exposed to international competition. Restructuring and rationalization is resulting in an increasing percentage share of the domestic market being held by imports.

The specialty and formulated industries have historically been headquartered in major industrialized countries — Germany, the U.K., the U.S. and, more recently, Japan. Relative to these centres, the Canadian industry is small.

The pharmaceutical industry in Canada is composed of companies that develop and manufacture patentable and proprietary medicines, and companies that produce generic medicines. About 80 percent of the industry is foreign-owned, with Canadian ownership concentrated in the generic segment. Virtually all companies in Canada formulate imported active ingredients into final dosage form, and derive the majority of their revenues from domestic sales.

For many products of the specialty and formulated, and pharmaceutical industries, there are factors that impede international trade, including high production costs, a high service component and differing national regulatory and labelling requirements. In the emerging global trade environment, efforts are under way to reduce transportation and standards barriers. Changing conditions in the world marketplace have encouraged these industries to adjust, as the commodities industries did before them. Economies of scale, innovative management techniques, management-labour relations and improved manufacturing technologies are all contributing to this more open and more competitive marketplace.

Different competitive forces confront the commodity and specialty groupings of the sector. For the commodity sector, the traditional advantages are raw material and energy availability at world-competitive prices. Canada's greatest strength lies in world-scale production facilities that have been installed and operated to supply the Canadian and export markets. The challenge ahead is to keep these facilities competitive through constant upgrading. In contrast, the specialty and formulated chemicals portion of the sector has been supplied in large part from products developed and manufactured abroad. It is this area that provides the greatest potential for future growth. Canadian companies will have to acquire the necessary product and technology-development skills to be successful. Most companies do not possess them now.

The challenge provided by the FTA is to expand Canadian manufacturing to supply a greater share of the U.S. and Canadian markets. Bilateral and multi-lateral negotiations notwithstanding, there are still significant barriers to free movement of goods and services worldwide, and a large national market base still confers advantage, particularly for the downstream value-added sectors. A challenge in the 1990s, as tariff barriers are reduced, will be for government to concentrate on the removal of non-tariff barriers worldwide, and for industry to take advantage of the opportunities that subsequently emerge.

Strengths and Weaknesses

Resources and Raw Materials

Canada's traditional strength in the chemical sector has come from the availability of competitively priced resources. Much of the petrochemical expansion in Canada in the late 1970s and early 1980s was undertaken with the expectation of a long-term cost advantage for feedstocks. Since deregulation in the 1980s, this feedstock price advantage has been either lost (oil) or reduced greatly (gas), but security of supply has remained a significant advantage. As well, the chemical sector has generally had ready access to competitively priced electricity and mineral inputs, either at or below the cost to major competitors. In this environment, the commodities sector has grown to become world-competitive, and can expect to continue growing under the FTA.

For downstream manufacturers such as fine chemicals, pharmaceuticals, paints, cleaning compounds and others, material input costs have been slightly higher than for industries in competing countries (mainly the U.S.). The FTA, and the resultant greater availability of competitively-priced inputs, will lessen this imbalance.

Transportation

The Canadian chemicals industry is located next to the world's largest market (the U.S.) and is generally well served by an efficient, safe and competitive delivery system for both domestic and foreign markets. Canadian commodity producers have lower distribution costs into target Canadian and northern U.S. markets than their major competitors, who are predominantly on the U.S. Gulf Coast. As a result, in

the 1980s, Canadian exports to the U.S. of petrochemicals, fertilizers and inorganics grew in market share and dollar value.

All subsectors of the industry supported transportation deregulation, which resulted in more diversified and competitive options for both sourcing of inputs and marketing of products.

Innovation

R&D performance in the sector is below international standards. At about 2 percent of sales, Canada is performing at about one half to one third of the level of major competing countries. For the multinationals in the 1980s, R&D continued to be preferentially located in the country of corporate ownership and in major market areas.

Technology is often readily available internationally from a parent company, or under licence. Although Canadian manufacturers in the 1970s and 1980s used the latest technologies, they were generally not the industry leaders. As a result, Canadian production and, more markedly, Canadian exports, have focused on commodities. In the pharmaceutical and crop protection industries, for example, Canada imports virtually all of its active ingredients.

Notwithstanding this limited industrial R&D performance, Canada has an excellent academic infrastructure. We have world-calibre scientists, chemists and engineers, and our universities excel in organic synthesis, biotechnology and medical research, among others. In addition, we have developed particular niche skills in process development by using the latest technologies, and by adapting to emerging environmental requirements.

While R&D performance and domestic innovation are less than desired, Canada has ready access to the latest technology, along with a demonstrated ability to adapt that technology to Canadian conditions. For pharmaceuticals, and in response to improvements in inventors' rights made to Canada's drug compulsory licensing patent law in 1987, the multinational pharmaceutical companies made commitments to increase R&D in Canada. The industry has nearly doubled its R&D as a percent of sales since then, reaching 10 percent of sales in 1989.

For the specialty and formulated industries, a secure manufacturing base on a scale beyond that which currently exists in Canada is probably necessary to afford research at the level undertaken by Canada's major competitors.

Labour and Management

The chemical sector attracts a well-trained, professional labour force. Industry has undertaken in-house training for much of its own special needs and, for large companies in particular, project management approaches and attention to detail and service have resulted in world-calibre operations. The sector has an excellent safety record, and some innovative labour-management successes are used as industrial models (e.g. Du Pont Canada: shift crews managing themselves). In the specialty and formulated sector, Canadian management is being challenged as never before to meet world competition. Broad product ranges, short runs and domestic marketing are slowly being replaced by niche products and markets, world-product mandates, joint export marketing and R&D linkages.

Recent declining college-level enrolment in the sciences has been suggested as a societal reaction to the image of the chemical industry. More likely, this reflects the current perception of limited job possibilities, and corresponds to similar cycles that have been seen in the past. For the future, provision of stability in the outlook for well-paying jobs may be the critical factor in improving the flow of skills into the sector.

It is important to note that the pharmaceutical industry, like other industries, places considerable emphasis on the availability of top research scientists and research infrastructure when deciding where to locate a plant (Merck Frosst cites that this was a key factor in deciding to establish their research facility, employing 300 scientists, in Montreal).

In the late 1980s, a trend emerged toward consolidation of North American sales forces and relocating some senior officers and head office functions to the U.S. While this relocation is perhaps a natural outgrowth of globalization and foreign ownership, it can result in a gradual lessening of the important contribution that internationally experienced Canadian managers have been able to make in aggressively seeking out new investments for Canada.

Cost of Production and the Investment Climate

The key requirement for growth in this sector is the willingness of the private sector to invest. Where they exist, disadvantages of locating facilities in Canada must be faced. The most important of these for the commodities-based industries are the capital cost of facilities and the relatively low projected returns on investment.

Because of Canada's harsh climate and high construction labour costs, new plant construction costs can be 15 to 25 percent higher in Canada than in the U.S. This capital cost disadvantage, which has a direct impact upon return on investment, has existed throughout the 1970s and 1980s. While our climate cannot be changed, other considerations will need to be examined carefully in the 1990s.

A major factor influencing return on investment is the current corporate tax regime. It is the view of the chemical sector that although 1988 federal corporate tax changes have brought Canadian federal corporate tax levels more in line with those in the U.S., the combined federal and provincial taxation rates, including the difference in capital cost allowance provisions, favour U.S. locations over Canadian ones for some chemical projects. This industry view is supported by a 1990 Conference Board of Canada study that compares tax levels for similar petrochemical projects in each country.

The specialty and formulated industries in Canada are generally not world-scale. As a result, unit costs of production tend to be higher than those in competing countries.

Regulatory Environment

In response to a growing societal concern for the environment, the Canadian Chemical Producers' Association implemented a Responsible Care Program in the 1980s. The CEOs of more than 70 of Canada's largest chemical manufacturers committed their companies to a stringent set of operating codes of practice that govern manufacturing, transportation, waste management, community emergency response planning and public knowledge of their products. This model has been adopted in principle by chemical industries in the U.S., Europe, Japan and Australia, and was recognized in 1990 by the United Nations Environment Program with a Global 500 award. As well, non-member chemical companies

and industries in other sectors of the Canadian economy are examining the Responsible Care Program as a model. Canadian leadership is ensuring that this sector is at the leading edge of environmental innovation and response to societal needs.

At the same time, the industry has expressed concern with the impact that new Canadian regulations, not found elsewhere, will have on its ability to innovate and compete in international markets. Through consultations with industry and other stakeholders, federal and provincial agencies are making every effort to ensure that new regulations to achieve desired environmental objectives will not unduly influence the ability of the chemical sector to grow and prosper in Canada. Federal-provincial overlaps in the regulatory process that present undue obstacles to the companies doing business in Canada must also be addressed.

In the pharmaceutical industry, for example, there is provincial price regulation on drug products. As well, interprovincial regulatory differences have a tendency to fragment the market, limit market access and introduce delays in launching new products.

Canada's intellectual-property rights for pharmaceutical products provide less protection than do those of other developed nations. Compulsory licensing of drug patents allowing import of medicines was introduced in Canada in 1969 in an effort to lower consumer drug prices by encouraging the growth of the generic industry in Canada. In 1987, this provision was modified to improve inventor's rights as the government sought to balance the desire for reasonable prices, while at the same time obtaining increased R&D and manufacturing in Canada by the international drug industry. Despite this improvement, the differential has been increased recently, because some industrialized countries are extending effective patent life to compensate for time required for regulatory approval. It is still a significant constraint for Canadian subsidiaries seeking research and manufacturing projects from international pharmaceutical parents. The latter seek a similar level of market exclusivity for Canada as for the U.S. and Europe, of the order of 14 to 16 years of effective market protection.

Linkages and Alliances

Through mergers, rationalization of production facilities and vertical integration, multinational companies have established a good measure of international

competitiveness in the commodity chemical sub-sector. It appears desirable for producers of specialty and formulated chemicals to emulate these linkages. Joint marketing efforts for small firms, and institutional linkages aimed at commercializing strategic technologies (such as biotechnology and advanced materials), are examples of ways to improve.

Outlook for the 1990s

There is an attractive case for chemical sector growth for Canada for the 1990s. The performance of the sector in the latter half of the 1980s demonstrates the industry's ability to be internationally competitive. Prospects for long-term growth worldwide are also good, notwithstanding the cyclical nature of the industry, which can result in periodic overcapacities. Professional and scientific expertise is available, there is an educated industrial work force and a solid industrial base, and the infrastructure is in place to support the development and marketing of high-value-added chemical products formulated for specific end uses. Finally, the FTA (and a future North American free-trade zone) provides the opportunity for access to a larger market.

In a world tending toward more centralized decision making, management in the sector will need to demonstrate and actively promote the view that Canada is a reliable, profitable place to do business, that there are tangible benefits to being a good corporate citizen, and that serving export markets — as well as domestic markets — is crucial to achieving competitiveness.

Two critical issues that need to be addressed for the commodities-based industries are taxation and costs of construction. For the specialty and formulated products-based industries, the situation is more complex but the opportunities for growth are significant. These industries are still in the process of adjusting to global markets and global competition. To the extent that they are successful, a more efficient export-oriented, high-value-added industry will emerge.

While additional R&D spending in Canada is desirable, greater short-term opportunity lies in transferring technical innovations from abroad to manufacturers in Canada, to increase both domestic and export markets. We need to be efficient users of the latest technology.

The transition to high-value-added, formulated chemical products will require certain adjustments. Canadian companies will have to acquire and develop the expertise needed to succeed in these new activities, particularly scientific and management skills. The most immediate route to bring about this transition is to persuade multinational companies that their Canadian subsidiaries, on behalf of the parent, should take on production, research and product development mandates in selected product areas. Achieving significantly increased Canadian industry R&D in the sector will also require consideration by all stakeholders. As an example, our drug compulsory licensing patent law, although made less punitive to inventors in 1987, is still perceived by the majority of industry as an impediment to attracting new multinational activity in research and manufacturing in Canada. International industry sees these provisions as extremely negative, especially so since some industrialized countries are moving toward longer periods of patent protection. They seek a similar level of market exclusivity for Canada. There is the additional concern that, in the future, Canada's laws could be used as a model for many lesser-developed countries. At the same time, some generic producers are beginning to invest in the innovative product research necessary to ensure their rapid growth and to improve their competitive position in export markets.

Industry has stressed that the regulatory system for product approval and compliance with environmental protection legislation will present obstacles if it is more onerous in Canada than in other industrialized nations. If industrial development is to be targeted, Canada must ensure that international competitiveness is not unduly compromised as it strives to achieve environmental objectives.

Finally, Canada needs to ensure that international market access actually exists. For some parts of the sector, there remain pervasive non-tariff barriers into major world markets, including the U.S. For example, regulatory standards, the Buy America provisions, Small Business Set-Asides, the Foreign Sales Corporation, and procurement exemptions are obstacles to competitive access to the U.S. and other export markets.

There are many other horizontal issues that face all industries in studying competitiveness. However, special consideration of the above sector-specific

issues will have to be given priority if chemical sector growth is to be achieved in the 1990s.

A Sectoral Agenda for International Competitiveness

Canadian executives will be pressured more than ever to demonstrate to their corporate boards that Canada is a favourable location in which to do business in the 1990s, and that there are valid reasons for being good corporate citizens. Industry may wish to explore establishing a code of conduct for operating in Canada that acknowledges mutual benefits and obligations.

The Canadian chemical sector must be challenged to increase R&D as a requisite for competitiveness. Companies will need to have leading-edge manufacturing technologies and products, including those responding to new environmental regulations. While it is not essential to develop the majority of these in Canada, Canada cannot be just a nation of technology followers. Due to the lag time inherent in technology transfer, world markets belong more and more to the leaders in innovation.

Since the chemical industries in Canada are largely foreign-controlled, the assignment of world-product mandates for selected business areas to Canadian divisions of companies should be targeted. These mandates will have to be won from the parent company.

Canada will need a management-labour mind-set that regards the world as its market and its competition. It will take a cooperative approach to succeed.

Pressure will be on government to stay the course on policies already in place (e.g. freer trade, energy and transportation deregulation, tax reform, and a continuing consultative approach to regulatory reform).

It will be critical for industry and governments in Canada to reach consensus concerning the impact that capital costs and combined federal-provincial tax measures will have on the attractiveness of investing in Canada (compared with investing in the U.S.) for specific market opportunities.

The Government of Canada will need to ensure that two-way market access emerges from such international initiatives as the FTA and the current GATT and NAFTA negotiations. Non-tariff measures will also have to be addressed.

Greater federal-provincial cooperative effort will be required in the 1990s to address interprovincial barriers to trade, and regulatory duplication.

FROM ITS EARLY BEGINNINGS, THE FOREST PRODUCTS SECTOR HAS PLAYED AN integral role in the economic development of Canada. In the words of Dr. Stuart Smith, former President of the Science Council of Canada: "If Canada did not have her forest industry, we would be a developing country." The sector is one of Canada's leading industries in value of manufacturing shipments, employment and export earnings. A major economic force in all regions of the country, it represents about 48 percent of manufacturing in British Columbia, 26 percent in Atlantic Canada, 16 percent in Quebec and 7 percent in Ontario and the Prairies. Approximately 350 communities across Canada are dependent on the forest sector, which employs about 300 000 people, including some 45 000 in forest harvesting and management operations.

Structure

The forest products sector is composed of two major industry groups: Paper and Allied Industries, and Wood Industries. The Paper and Allied Industries group accounts for 63 percent of total shipments and employs about 130 000 people. It is made up of two distinct segments: pulp and paper (market pulp, newsprint, fine papers and paperboard) and converted or value-added paper products (packaging, coated papers, business papers and stationery, tissue and other consumer paper products). The wood industries group accounts for 37 percent of total shipments and employs approximately 125 000 people. This group consists of two segments: commodity products (lumber, plywood, shingles and shakes, veneer, particleboard, oriented strandboard/waferboard); and value-added wood products (manufactured housing, doors, windows, kitchen cabinets, hardwood flooring, pallets and millwork).

Paper and Allied Industries

The Paper and Allied Industries group comprises more than 700 establishments across Canada, consisting of large, capital-intensive, integrated and non-integrated producers as well as small, regionally based operations. The main producing provinces are Quebec, Ontario and British Columbia, although the industry is a major employer in all regions. The majority of pulp and paper establishments (about 150) are world-scale operations, often located in remote communities, close to the forest resource. Value-added paper products industry establishments (about 550) range in size and structure from small

non-integrated operations to multi-plant, capital-intensive ones that are located near urban market areas. The industry is largely Canadian-owned and operated. However, foreign multinationals are also present in Canada, notably as sole owners or partners of several of the larger integrated companies.

In 1989, shipments of the Paper and Allied Industries group totalled \$26.2 billion, of which \$20.8 billion was from the Pulp and Paper Industries sector with the balance made up of packaging (\$2.9 billion) and other value-added paper products (\$2.5 billion). Exports amounted to \$15.5 billion, consisting of: market pulp (\$6.9 billion), newsprint (\$5.7 billion), and other paper and paperboard and value-added paper products (\$2.9 billion). The U.S. is the most important export market, traditionally accounting for about 65 percent of the total value of group exports, followed by the EC and Japan at 18 percent and 8 percent respectively. The balance of export trade is spread worldwide, with significant markets in the Pacific Rim and South America.

Wood Industries

The Wood Industries group comprises over 3 600 establishments across Canada, predominantly Canadian-owned. The group is dominated by the sawmill sector, which in 1989 accounted for approximately 60 percent of total wood industry shipments. Commodity producers (softwood lumber and panel products) tend to be large, world-class operations, usually located close to forests in remote regions. The value-added and hardwood subsectors are generally small in scale, labour-intensive and located in or near urban centres.

In 1989, Wood Industries group shipments totalled \$15.2 billion. The sawmill subsector (largely softwood lumber) accounted for \$9 billion, panel products and other commodities for \$2.1 billion and value-added products for the balance, \$4.1 billion.

Wood Industries exports totalled \$6.9 billion in 1989. Of this, softwood lumber exports accounted for \$5.4 billion, panels and other commodity products for \$0.9 billion and value-added products, \$0.6 billion. The U.S. market accounted for approximately 66 percent of Canada's total exports of wood products, followed by Japan and the EC at 16 percent and 13 percent, respectively. The remaining 5 percent of exports were to various offshore markets.

Performance

Cost Position

In the latter part of the 1980s, rising wood costs had a marked effect on the profitability levels of forest products companies. Wood costs ranged from 25 to 50 percent of total costs, representing the major input cost for market pulp, newsprint, softwood lumber and most other commodity products. Other major costs were labour, energy and, in the case of pulp and paper industries, chemicals. Transportation costs also constituted an important competitiveness factor, affecting industry's ability to compete with local producers in export markets.

Canada's pre-eminent trade position in commodity forest products was built upon the competitive advantage provided by a readily accessible, abundant and economical, high-quality forest resource and low-cost electrical energy. Most of the harvest, until recently, has been in natural forests, established without cost in the conventional sense. However, the industry in several regions of Canada began to operate at the upper limit of economic wood supply and increasingly had to rely on more distant, higher-cost, and often lower-quality forests. Although competitors had achieved superior levels of wood-fibre yield and lower unit labour costs, Canada's wood costs tended to compensate for such cost disadvantages in the past. However, competitors in industrialized and developing countries also developed products and modern processes that used fast-growing indigenous species. The result was that new and more challenging

standards of international competitiveness were established.

While Canada's access to low-cost virgin wood fibre has diminished, certain industry segments, such as the reconstituted-wood-based panel industry, utilized readily available sawmill residues. The oriented strandboard/waferboard industry was based on the aspen and poplar resource, which is abundant in most regions of Canada. Over the years, Canadian producers significantly improved the use of raw materials in efforts to reduce the cost of wood fibre. The development of technology to process small diameter logs into lumber is but one example.

Since the early 1980s, ISTC and Forestry Canada have sponsored the annual cost studies of the Forest Sector Advisory Council (FSAC) to compare the competitive positions of the five major manufacturing regions (Canada, the U.S. South, the U.S. West, Sweden and Finland) involved in two key commodities — market pulp and newsprint. These studies indicate that the U.S. South has consistently ranked as the lowest-cost producer, usually followed by the U.S. West. The study results for Canada for 1990 are provided in the following table.

**MARKET PULP AND NEWSPRINT
CANADA'S COMPETITIVE COST POSITION - 1990**

	PULP	NEWSPRINT
Wood Fibre	3	2
Processing	5	3
Labour	5	5
Energy	4	2
Overall	3	3

Legend: 1 - Lowest cost; 5 - Highest cost

Source: FSAC.

U.S. South is the lowest cost producer because it has access to low-cost wood fibre and efficient wood utilization with modern, world-scale production facilities. Although Canadian wood costs are not greatly different from those in the U.S., productivity is lower, primarily due to older equipment. Although wood and energy are more expensive in Finland and Sweden, producers have achieved lower unit manufacturing costs than Canada for energy, labour and processing. In both Finland and Sweden, capital investments in co-generation, large and more-efficient

plants, and new equipment have resulted in lower unit costs.

In softwood lumber, the Canadian industry had attained a high level of productivity and held a good competitive position as it entered the 1980s. The appreciation of the Canadian dollar has had an impact on the competitiveness of this industry against its American counterpart in recent years. Canadian softwood lumber exports are primarily made to the U.S., and the strong Canadian dollar has reduced margins for domestic producers in that market. The competitive position of Canadian producers was also eroded by the imposition of a 15 percent export tax in 1987 (unilaterally withdrawn by Canada in October 1991). This tax was implemented to forestall trade action by the American government against Canadian exporters. While Atlantic Canada was exempt, all other regions were subject to the tax. Some provinces have taken action to deal with the objections raised by the Americans. These actions have increased stumpage fees and, consequently, raised wood costs for lumber, pulp and paper mills, plywood plants and other downstream subsectors.

In the value-added wood and paper sectors, access to economically priced grades and species of primary products was also a significant competitiveness factor. For companies in these sectors, however, competitiveness was influenced more by economies of scale, production efficiencies and product specialization. Many of the smaller producers had neither the economies of scale nor the marketing organizations to compete effectively with U.S.-based firms.

Results

In 1989, total forest products sector shipments reached a peak of \$41.4 billion. Exports amounted to \$22.4 billion (16.5 percent of Canada's total), while imports were \$3.3 billion, providing a trade surplus of \$19.5 billion. During the 1980s, the sector contributed between 2.6 and 2.8 percent of Canada's GDP, and accounted for 13 to 15 percent of total manufacturing activity and 14 to 17 percent of total exports.

During the 1980s, growth in production capacity varied between the major commodity items. From 1980 to 1988, newsprint production rose approximately 16 percent in volume, wood pulp rose 19 percent, softwood lumber 36 percent and wood-based panels 28 percent. The most substantial volume

increase, 40 percent, was in the paper and paperboard commodity category. While these figures portray strong volume growth in certain subsectors, depressed world prices restricted financial performance in the 1980s.

The profitability of the Paper and Allied Industries group (measured as the return on capital employed) exceeded the average for the manufacturing industries sector in the 1980-81 and 1987-89 periods, but fell substantially below it from 1982 to 1986. In Wood Industries, profitability during the 1980-84 period fell substantially below the average of the overall manufacturing sector. Profitability rose above the average from 1985 to 1987 and then fell for the balance of the decade. These fluctuations reflect the cyclical nature of the industry and the unusually long period required for recovery from the 1981-82 recession.

In 1988, the three dominant export commodity products (market pulp, newsprint and softwood lumber) made up over 84 percent of Canada's total forest products exports, as compared with 43 percent in the Nordic countries. The high dependence on commodity products affected profitability because these products are generally more sensitive to market price fluctuations than value-added ones.

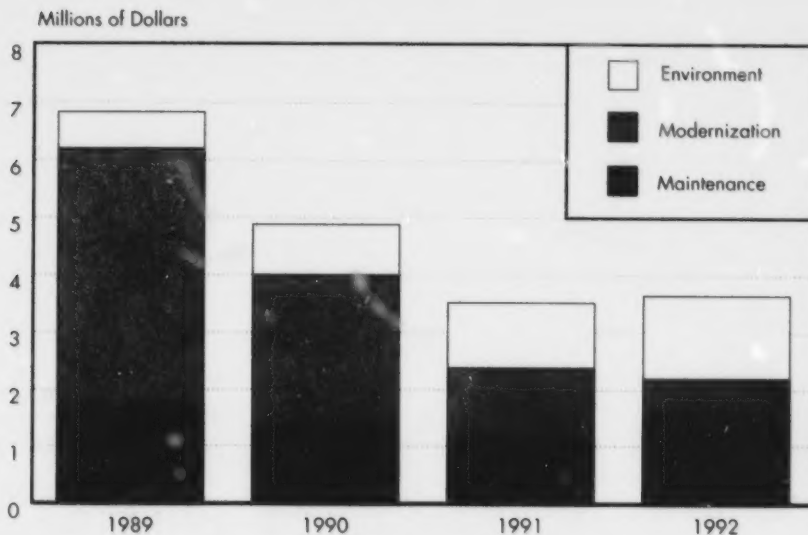
Strengths and Weaknesses

Capital Investment

During the 1980s, the Canadian pulp and paper sector invested over \$30 billion in capital and repair projects. Since 1985, capital and repair expenditures have been at record annual levels, increasing from \$3.2 billion in 1985 to \$7 billion in 1989. Annual expenditures were split between plant and machinery repair (30 to 40 percent) and investment in modernization and expansion (60 to 70 percent).

Capital expenditures were focused on augmenting capacity, increasing energy efficiency, improving environmental performance and upgrading plant facilities. Most major companies also made substantial investments in new pulp production and newsprint capacity, many times shifting away from sulphite, kraft and stone groundwood pulps to lower-cost thermomechanical pulps. Several older newsprint machines have been upgraded to produce high-valued groundwood specialty papers. In comparing Canadian and U.S. investment throughout the 1980s, it should

CHART 1
PULP AND PAPER INDUSTRY
CAPITAL EXPENDITURES SHIFT FROM COMPETITIVENESS
TO ENVIRONMENT, AS TOTAL DECLINES



Source: CPPA, December 1990.

be noted that while Canada invested twice as much in its commodity newsprint and pulp operations, it invested one-third as much in the other commodity and higher value-added paper and paperboard operations.

The major investments in pulp and paper mills resulted in the establishment of facilities with state-of-the-art technology and capacity. However, Canadian industry continues to lag behind U.S. and Nordic competitors in terms of average newsprint machine size (104 000 tonnes in Canada versus 146 000 tonnes in the U.S. South and 175 000 tonnes in Sweden) and pulp capacity. (The average pulp capacity per mill in Canada is less than 1 000 tonnes per day, compared with mills in the U.S. South, Finland and Sweden, which have up to 25 percent greater capacity.)

The average age of Canadian newsprint and pulp mills, particularly in Eastern Canada, also continues to be a concern when compared with major competitors in the U.S. South, Finland and Sweden. However, Canada has a much longer history as a newsprint exporter than do the Nordic producers, who did not

enter the newsprint market until the 1960s and consequently have more-modern facilities. Although the forestry industry invested considerably during the 1980s, many eastern Canadian mills invested in improvements to existing equipment rather than replacing it with state-of-the-art technology, as mills in other regions of Canada and in competing countries did.

With the decline in profitability starting in 1989, the increased value of the Canadian dollar and the cyclical downturn in demand, pulp and paper companies have experienced reduced cash flows. Moreover, meeting modernization needs and complying with new environmental regulations require an increasing proportion of investment capital, which is scarce. Companies recognize the need for expanded and innovative sources of capital as the effects of the limitations on traditional sources such as cash flow and debt are felt. The chart illustrates capital expenditure trends and the growing share required for environmental compliance in the pulp and paper industry.

Because companies are forced to assess which mills can be improved to meet competition as well as envi-

ronmental standards, a major restructuring phase has begun. This process is similar to what already occurred in Sweden and Finland, where old mills were closed, newer mills were expanded and modernized, and the number of plants declined dramatically. The eventual result for these countries was an overall increase in sectoral competitiveness. However, given the forestry industry's widely dispersed structure, this process is more difficult for Canada. The impact of rationalization is being felt in many small communities where alternative employment options are limited.

For the Wood Industries, investments during the 1980s totalled \$9.1 billion, much of it directed towards mill modernization and capacity expansion in the lumber and panel products subsectors. In the sawmill subsector, investment has been focused on improvements such as microelectronic control systems, automatic sorters, optimizers and scanners to increase wood utilization and labour productivity. In the case of the wood-based panel products industries, investment has been directed to expansion, particularly in the area of the newly emerging products: oriented strandboard/waferboard, medium-density fibreboard and overlaid particleboard.

Environmental Challenge

The forest industry worldwide is confronted with pressures from consumers and governments to address environmental concerns. These concerns include: forest management practices and wildlife habitat, mill effluent, solid waste disposal, and demands for products and processes that reduce the burden on the environment. These complex and interrelated issues have short, medium and long-term implications for the international competitiveness of the Canadian forestry sector.

Environmentalists and forest-users are at odds about forest management practices (harvesting and silviculture), the impact on global warming, wildlife protection and the long-term sustainability of the resource. While forest management in Canada has historically focused on timber and fibre production for industrial users, considerable concern now centres on multiple land use and Aboriginal land-claims issues. Industry's response to environmental pressures must be made within the context of forest management practices that are largely prescribed by provin-

cial authority and are based on the particular circumstances of each region.

The competitive and technical challenges facing the industry as a result of environmental issues are complex. Environmental regulations proposed by Environment Canada (scheduled to come into effect on January 1, 1994) and proposed regulatory changes to the *Fisheries Act* set out stricter discharge limits for suspended solids, oxygen-demanding substances and toxicity. Pulp and paper mills have dramatically reduced the environmental risk associated with effluents over the past decade. The discharge of dioxins and furans will be virtually eliminated and, in fact, the industry already largely meets the new standard.

The industry has estimated that \$5 billion, involving up to 75 percent of Canada's mills, will be required over the next few years to meet these and other new environmental regulations. In this regard, the present economic climate and financial performance of the industry present a serious limitation to its ability to fund these requirements. Industry and government are striving to develop new technology and workable solutions to address these issues. However, environmental compliance will increase mill operating costs in many instances and, therefore, may contribute to the pressures for restructuring of the industry.

Concerns about solid-waste management are another challenge to the forest industry. Recently, in an effort to reduce the volume of paper going to landfills, aggregate recycled-content consumption targets, calling for up to 50 percent recycled fibre for newsprint, were legislated in a number of U.S. states. Similar initiatives are being considered by certain European countries. The requirement poses a burden on Canadian mills. To maintain continued access to international markets, they will need to import a substantial volume of old newspapers to supplement the limited supply available in Canada. Mills will also need to continue making substantial investments in de-inking and recycling facilities to convert old newspapers into newsprint. Investments will also be required in facilities to handle the disposal of potentially toxic wastes and sludge generated by some de-inking processes in paper recycling.

Other environmental initiatives relating to labelling and packaging waste reduction will also have an impact on the direction of industry investment expenditures.

Human Resources

Most Canadian forest products mills are located near the resource base, generally in remote regions. Attracting and keeping professional, educated managers and highly skilled workers and their families away from urban centres is a difficult task, especially during periods of low unemployment. Consequently, the industry has to offer high salaries and other incentives, which reduces its ability to compete. In addition, the frequency and magnitude of economic cycles affecting the forest products industry further hinder the ability of mills in remote communities to attract new workers or hold on to existing staff, especially in management and higher-skilled jobs. The problem continues to intensify as mills introduce computerized operations, as well as new plant and process technology.

The history of labour-management relations in the Canadian forestry industry, and the resultant international image, have been poor. Following a major strike in 1986, which entailed prolonged production curtailments and adverse reactions in major markets, efforts were focused to resolve the issues involved. Accordingly, three federal government departments (Labour, Regional Industrial Expansion, and Employment and Immigration) and the Canadian Forestry Service assembled resources to undertake a Forestry Sector Labour Adjustment Study. This study, published in November 1988, gave management and labour an insight into the mobility of displaced workers in the industry, and of the related human-resource issues.

In late 1987, through the joint effort and cooperation of the Western Canadian Regional Council of IWA-Canada and the Council of Forest Industries of British Columbia, a program was launched to improve labour leaders' and union members' understanding of the factors affecting sector competitiveness. Under this initiative, industry and labour representatives undertook study visits to familiarize them with market conditions and key competitiveness factors in major markets in Europe, Japan and the United States.

As well, the Western Wood Products Forum (WWPF) brought together major forest-product companies and labour to address issues such as higher value-added production and effective forest management. In March 1991, the WWPF moved to strengthen its activities through an industry conference, which addressed international competitiveness

and future direction. In eastern Canada, similar efforts have been initiated to bring about closer labour-management liaison. These measures have been instrumental in improving labour-management relations in this sector.

Market Access

As the world's largest exporter of forest products, Canada has a strong interest in unimpeded access to world markets. As a result of tariff reductions achieved through successive rounds of multilateral trade negotiations, Canadian exporters have gained improved access to important world markets, particularly for the major commodity products. Bilateral trade agreements such as the FTA have also improved access to important markets and have established a better mechanism for resolving trade disputes. This is an important development for a sector that was subject to several U.S. protectionist actions in the 1980s.

While multilateral and bilateral initiatives have reduced or eliminated a number of tariff and non-tariff barriers, Canadian exporters of forest products still face some key trade restrictions that affect the sector's ability to capitalize on market opportunities. These include significant tariff levels for higher-valued products (fine papers) and non-tariff barriers (recycled fibre content in newsprint, restrictive foreign building codes and product standards).

In Europe, Canada faces a number of barriers. In 1984, when the European Community-European Free Trade Agreement Industrial Products Agreement came into force, Canada negotiated a 600 000 tonne GATT-bound duty-free newsprint quota with the EC. A provision of this agreement was that if the quota was exhausted before year-end, the EC could open an autonomous quota of 30 000 tonnes. An additional volume over this was subject to EC deliberation between member states. In 1990 and 1991, the quota was exhausted a few months before year-end, resulting in disruption to shipments of Canadian newsprint. Nine percent duty was applied in some cases, and this is of concern since Canada's major competitors in the European market, Sweden and Finland, have unrestricted access to the EC.

Other trade impediments in the EC include restrictive building-code standards for wood, and the GATT-bound duty-free quota on imports of softwood plywood. In addition, phytosanitary restrictions will require softwood lumber entering the EC market

from certain supplying countries, including Canada, to be kiln-dried, beginning in January 1, 1992. This requirement will have serious repercussions for green-lumber shippers to the EC (who, in 1988, accounted for almost 90 percent, or \$650 million, of the total value of softwood lumber exported there). Should this plant health regulation not be modified, the Canadian industry will need to install additional kiln-drying facilities to retain access to this vital market. Exporters of western hemlock from British Columbia are further hampered by a lack of kiln-drying technology for this important west coast species, particularly for the thicker dimensions required in many markets. These requirements have generated considerable interest and activity in new kiln-drying techniques for softwood species, including those in eastern Canada.

In the Japanese market, Canadian exports of planed spruce/pine/fir (SPF) lumber are subject to a high tariff (8 percent) compared with competing American wood species (hemlock in particular) that enter duty-free.

In the U.S., pending resolution of the Canada-U.S. dispute on softwood plywood standards, tariffs on particleboard, oriented strandboard/waferboard and softwood plywood (which have been held at pre-FTA levels) will begin to decline. With regard to softwood lumber, in September 1991, the Government of Canada gave notice to the U.S. of its intent to terminate the 15 percent export charge on Canadian softwood lumber exports to the U.S., effective October 4, 1991. The government expressed the view that conditions have materially changed since the MOU was signed in December 1986, and that it was time for Canada-U.S. lumber trade to be normalized.

In an effort to address trade-access issues, expand the export base and develop new markets, the Cooperative Overseas Market Development Program (COMDP) was established by ISTC with various provincial governments and industry. The COMDP is a three-way, jointly funded market-development partnership established to reduce the dependence of the Canadian wood products industry on highly cyclical North American markets, through expansion of overseas markets. It has been particularly successful in the EC, Japan and the Pacific Rim.

Other market-development initiatives were introduced by ISTC at the end of the 1980s, including the Cooperative Industrial and Market Development

Program (CIMDP), which promotes the industrial and market development of specialty wood products, and the Timber Frame Construction (TFC) demonstration program.

Value-Added Products

In the 1980s, the value of Canadian exports of higher value-added products grew at double the pace of market pulp, newsprint and softwood lumber, although this increase started from a much lower base. In 1988, Canadian exports of value-added paper and paperboard products represented 10.6 percent of total Canadian forest products exports, as compared with 24 percent for the U.S. and 52 percent for the Nordic countries.

To generate more wealth from Canada's wood resource, there is a growing recognition of the need to increase the value-added component of output. Specialty product manufacturing in Canada, however, has not developed uniformly across the country, due, in part, to variations in the wood resource, fragmentation of the industry, a narrow market base, transportation costs, limited levels of innovation and the slow progress of some producers in changing direction from a *volume* to a *value* strategy.

R&D and Innovation

The level of R&D spending by companies has had an important impact on the relative competitive positions of forest products manufacturers worldwide. Research and development is significant in the Nordic countries, and has produced a variety of innovative products and processes. An important technological advantage was achieved by the industry through undertaking R&D in close cooperation with equipment suppliers; development risks were shared and a mutually beneficial relationship was established. In Canada, few forest products companies have made significant long-term commitments to investment in R&D. An added major concern, in terms of future sector vitality, is the recent downsizing of R&D activities within several key companies as a result of the economic recession.

In an effort to address low levels of R&D spending, ISTC launched the Forest Industries R&D and Innovation Program to encourage increased private-sector investment in cooperative R&D projects. Eligible projects must be undertaken by R&D alliances comprising forest products companies,

equipment manufacturers and other allied industries or research organizations. Important objectives of the program are to increase the level of R&D activity through sharing project funding and to enhance technology transfer.

Although the Canadian industry tends to perform less R&D than its competitors do, many important technological developments and innovations have been achieved. Examples of major advances include the proprietary parallel-strand-lumber and alcohol-pulping processes.

Two factors that have contributed to the low level of expenditures on R&D in the Canadian industry are the nature of the products and the foreign ownership of several large, integrated companies. The level of research carried out on products considered to be commodities is traditionally lower than that on higher value-added products. As value is added, research levels tend to increase. While foreign parent companies tend to conduct the majority of R&D in their home countries, Canadian subsidiaries also benefit from their efforts.

Outlook for the 1990s

In the 1990s, the forest-products industry faces many challenges affecting the long-term economic vitality of this important manufacturing sector. In the past, Canada's forests were managed and utilized as a vast, self-renewing resource. While Nordic countries have been harvesting artificial forests over many years, Canada faces the cost of harvesting more distant, natural forests. The forest industry and governments will be challenged to enhance current policies directed at sustainable development. They must also address environmental and public pressures, which demand increasing restrictions on forest management. Given the seriousness of these concerns, it is essential that forest management be conducted to satisfy future supply needs with due consideration to environmental and silvicultural issues. The federal government's *Green Plan* proposes courses of action and sets objectives for achieving a state of sustainable development within a healthy environment, but government cannot and should not do this alone.

The world market for commodity products is expected to remain flat in the 1990s. The sector is experiencing reduced activity as a result of worldwide overcapacity and weak demand. Lower prices for the major commodity products have led to a serious fall in profitability for both the Paper and Allied Industries and the Wood Industries groups.

Canadian producers also face continuing competition in the world marketplace from new competitors in non-traditional producing areas (e.g. New Zealand and Chile), as well as from traditional rivals in the paper sector, who are already positioning themselves to serve the expectations of demanding and environmentally aware customers. Also, market pressures are expected to continue from products that are not based on the forest resource.

Because of demographic trends, little growth is expected in the North American housing market during the early part of the 1990s. Consequently, the demand for commodity products such as softwood lumber (as well as value-added wood products) can be expected to remain at low levels in relation to peak construction years such as 1988. On the other hand, world demand for paper and paperboard products is projected to rise significantly (in real terms), with growth in the printing and writing-paper segment estimated at 3.7 percent per annum. Forecasts indicate substantial market growth in the U.S. as well as in certain developing countries.

Because of overcapacity and competitive pressures, industry will need to make difficult decisions regarding the restructuring or closure of obsolete or inefficient mills. On the pulp-and-paper side, this may involve closing or converting outdated or poorly positioned (in terms of access to recycled fibre) newsprint plants, as well as closing, or making major investments in upgrading, inefficient pulp mills. In an attempt to meet the demand for products that contain higher levels of recycled fibre, the Canadian Pulp and Paper Association announced that, by 1995, its members intend to more than double the amount of recycled fibre now used in production. In view of the new recycling requirements and incremental newsprint capacity in the U.S., Canada's share of that market could decline.

On the wood side, opportunities will need to be explored in non-residential construction markets. With the help of program initiatives, such as the COMDP and CIMDP, and new activities of the Canadian Wood Council, a much greater emphasis on new markets will be necessary to offset the expected levelling of the U.S. softwood lumber market. This levelling will be due to changing demographics and the projected gradual decline in the number of North American housing starts. Overseas market development activities will need to be focused in order to sustain and expand export demand for Canadian wood products.

The Canadian forest products sector has reached a crossroad. If this sector is to meet the challenges of this decade and the next century, it must understand and address the demands of a global marketplace and confront the challenges of traditional and newly emerging competitors. To be competitive, the Canadian industry must develop and apply new technological solutions, such as biotechnology in pulping and bleaching processes, microelectronic process controls, advanced information technology systems and enhanced forest management techniques.

A Sectoral Agenda for International Competitiveness

To enhance the competitive position and prospects for the Canadian forest products sector in the 1990s, stakeholders must continue to work together to increase the wealth-generating capacity of the industry. The following framework is suggested as a basis for industry, labour and governments to collaborate in developing action plans to position Canadian industry to meet the challenges of the world marketplace in the coming decade.

Investment Climate

To improve the investment climate, stakeholders should:

- develop strategies to increase investment in value-added manufacturing in Canada;
- explore ways to promote a positive image of the Canadian industry that is attractive to financial institutions and investors (domestic and foreign);
- develop strategies to expand access to low-cost capital and competitive financing; and

- examine what action can be taken by management and labour, or what further actions the government can undertake, to improve economic stability and a more favourable climate for investment.

Environment

Industry, labour and government should work together to:

- commit to investments and practices consistent with both the needs of domestic and international customers and the objective of sustainable development;
- develop a common international scientific base through appropriate support programs and the involvement of Canadian research institutions and universities;
- inform customers, whether in Canada or in export markets, about environmental achievements and new *green* products;
- promote global harmonized standards and regulatory policies among all jurisdictions that help to safeguard against hasty reactions to specific situations;
- work with equipment suppliers and manufacturers in Canada to encourage development of environmentally beneficial technology and machinery manufacturing;
- respond to requests for environmental assessments in a timely and cost-efficient fashion;
- ensure that monitoring procedures for environmental regulations address the concerns of the public, allow for expeditious processing and do not place a significant financial burden on industry;
- assess whether new incentives are needed to encourage investment in environmental equipment; and
- ensure that industry-related environmental initiatives take full account of potential impacts on the competitive position of Canadian industry.

Cost Position and Productivity

To meet the challenges of the world marketplace, stakeholders should:

- develop joint strategies for reducing costs and improving productivity and efficiency;
- monitor labour practices in other jurisdictions and undertake continuous improvements to training programs that upgrade skills and foster a positive approach to the efficient operation of companies;

- develop strategies to ensure that an available, trained work force is prepared to enter the new positions created, and that the services offered by educational institutions compare favourably with those of key competing nations; and
- ensure that forest industry workers in remote regions have access to quality skills-upgrading facilities in order to create a climate of employment stability.

Market Access/Development

They should also:

- identify impediments to trade and take action to reduce them;
- encourage joint technical discussions to internationalize standards, codes and certification procedures;
- continue ensuring that specific international codes and standards (e.g. *Eurocodes 1992*, wood products standards and building codes in Japan) do not discriminate against Canadian exporters; and
- continue to cooperate in developing and implementing private-sector-led, export-market development and diversification agreements for wood products (e.g. COMDP and CIMDP).

Value-Added Products

Canada will improve its value-added products competitiveness by:

- continuing to cooperate in developing and implementing private-sector-led market development and diversification agreements, covering value-added products, such as a building products export organization, to support increased manufacture and sale of residential building systems;

- ensuring that Canadian research facilities continue to work towards the development of higher value-added products;
- pursuing economic opportunities for value-added production that increase returns on high-quality fibre and reduce the dependence of Canadian forest products exports on commodities;
- establishing stronger linkages with downstream users of wood and paper products (e.g. furniture producers and printers); and
- establishing additional forest-products specialist positions in foreign trade posts where development of value-added markets is a key objective.

R&D and Innovation

Finally, the forest industry should:

- define areas where competitive advantage can be gained through joint investment in R&D programs and test facilities;
- establish a cooperative network (industry, government, research institutions and universities) to find solutions through technology for the competitive challenges and environmental issues confronting the industry;
- establish a long-term commitment to cooperative research organizations and proprietary research; and
- explore opportunities for Canadian and international forest-industry companies, equipment manufacturers and suppliers to collaborate in developing competitiveness-enhancing technologies.

THE FERROUS AND NON-FERROUS METALS PROCESSING SECTOR TRANSFORMS ORES and metal concentrates into metals, which are fundamental inputs of industrialized economies. These internationally traded commodities are mixed to create alloys and are fabricated into metal products used in the construction, capital equipment, consumer durables and transportation industries. Ferrous metals include low-carbon, stainless and alloy steels, while non-ferrous metals include primarily, but not exclusively, aluminum, copper, lead, zinc and nickel.

The sector is a significant contributor to the Canadian economy in production, employment, exports and linkages to other sectors. Production totalled approximately \$16 billion in 1989, including \$9 billion in steel production, and \$7 billion in non-ferrous production. In 1988, primary metal production accounted for about 50 000 jobs in the steel industry and 30 000 in the non-ferrous industry.

While both subsectors process metal, they have distinctly different competitive positions. The steel industry serves primarily the Canadian market, providing steel for industrial applications such as the construction and automotive parts industries. Most of the steel industry's exports are bound for the U.S. As a result, the Canadian steel industry is fully integrated into the North American steel market. The non-ferrous sector is largely export-oriented, ranking as Canada's third largest exporter of manufactured products. This sector relies on, and has contributed to the growth of, the transportation, energy, mining and consulting engineering sectors.

Structure

The ferrous and non-ferrous industries are highly concentrated and often vertically integrated, both backward into mining and the production of metal concentrates, and forward into metal fabrication. The steel industry is concentrated in Ontario, but there are also production facilities in British Columbia, Alberta, Saskatchewan and Quebec. The non-ferrous industry is distributed more evenly across Canada, with aluminum production in Quebec and British Columbia, nickel production in Ontario and Manitoba, and zinc and copper production in Ontario, Manitoba, British Columbia and New Brunswick. The ferrous and non-ferrous subsectors are dominated by a few major Canadian-owned

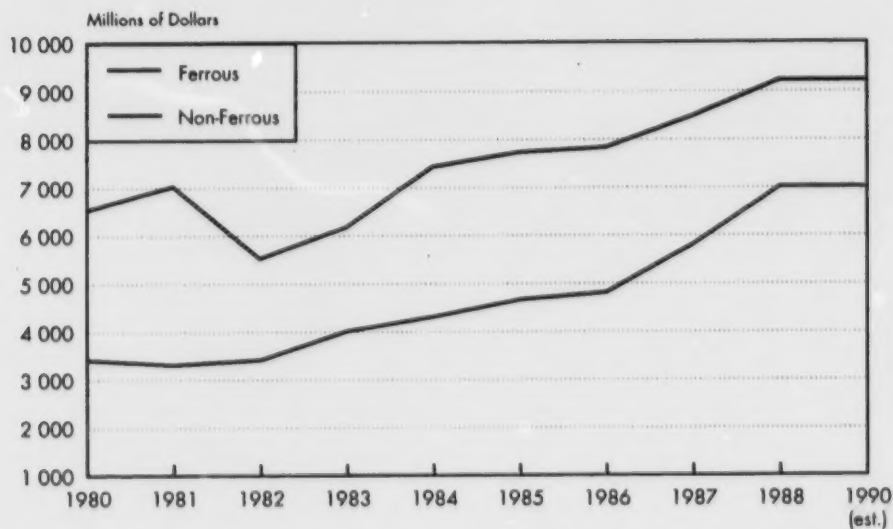
companies, notably the integrated steel producers Dofasco, Stelco and Algoma, and non-ferrous producers Alcan, Inco, Falconbridge, Cominco and Noranda. Whereas Canadian steel companies are domestically oriented and moderate in size relative to global competitors, Canadian non-ferrous companies are world-scale and global in scope.

The steel industry is not integrated into world markets by either trade or investment to the same extent as the non-ferrous sector. Exports of steel products total approximately 30 percent of shipments, and imports total approximately 20 percent of the Canadian market. While most of the industry's investments are in Canada, it has mining and/or production facilities in other countries, primarily the U.S.

In contrast, non-ferrous companies are fully vertically integrated worldwide, with an export orientation of over 90 percent, and significant investments in foreign smelting and fabrication facilities. Operations in Canada concentrate on the smelting and refining of ores and concentrates, which are then exported for further fabrication. Raw ore and concentrates are also exported for smelting abroad. Fabrication in Canada is limited largely to production for the domestic market — fabricated metals constitute only 10 percent of non-ferrous exports. Canadian producers are encouraged to export smelted metals rather than fabricated products, because of tariff structures that penalize further processing, high transportation costs and the need to fabricate products close to customers.

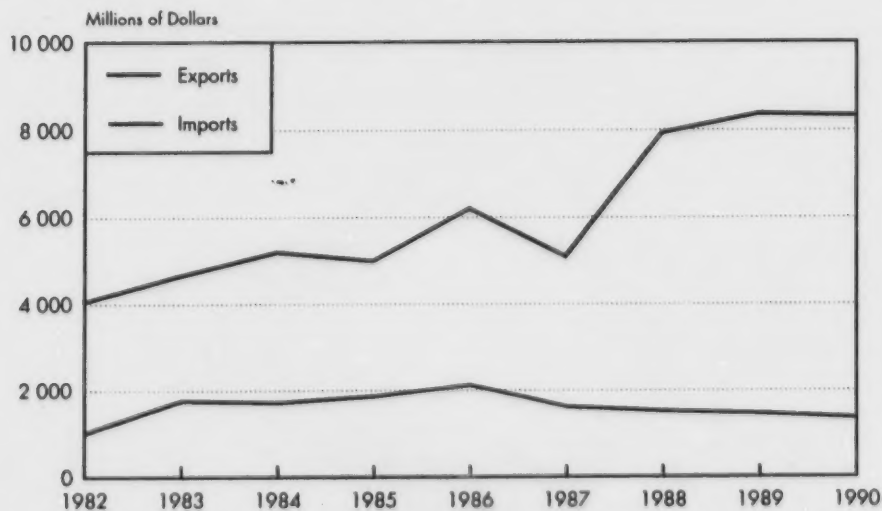
American companies are Canada's primary competitors in the steel sector, followed by Japan. Other major competitors in the ferrous subsector are large, often state-owned companies such as those in Korea, France, South America, the U.K. and Germany. In the non-ferrous industries, major competitors are

CHART 1
SHIPMENTS
FERROUS AND NON-FERROUS METALS



Source: S-BID of DRI Canada.

CHART 2
TRADE PERFORMANCE
NON-FERROUS METAL



Source: S-BID of DRI Canada.

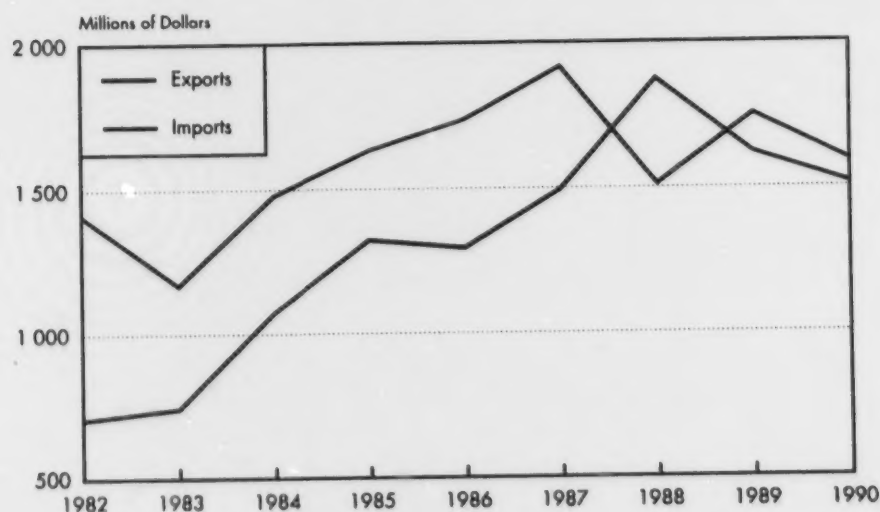
large global companies such as Alcoa, Reynolds, RTZ (Rio Tinto Zinc) and MIM (Mount Isa Mines).

While both the ferrous and non-ferrous subsectors remained highly concentrated, the degree of concentration decreased in the 1980s with the emergence of new competitors and increasing use of consortia. Dominance of the integrated steel producers is increasingly being challenged by mini-mills, which have lower costs and are beginning to manufacture products previously produced only by the integrated producers, such as large-size, wide-flange steel shapes, and steel plate and sheet. Global consortia have emerged as a means of sharing the fixed costs of building new capacity, transferring technology and supporting R&D. For example, a total of nine foreign-owned companies are financing two major aluminum smelters in Quebec, supported by the Quebec government. Three joint ventures among Japanese and/or Canadian-owned firms have been established to develop steel galvanizing lines for the automotive and construction markets.

Performance

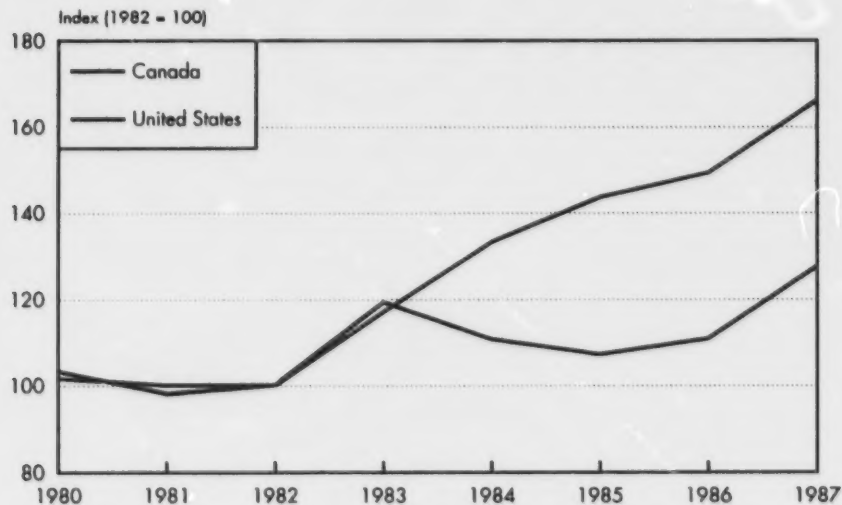
As a basic input of industrial and consumer goods, the performance of the metals processing industry is highly cyclical. Double digit increases in demand in the 1960s and early 1970s led to rapid expansion in capacity. Growth rates began to decline following the oil shocks in the 1970s, reflecting slower economic growth, and shifts to lighter, more energy-efficient products, particularly in the automotive sector. Depressed demand led to overcapacity and depressed prices, with cuts in employment and output. Both ferrous and non-ferrous subsectors recovered slowly from the recession of the early 1980s, with output and prices recovering only near the end of the decade. Global supply and demand are now generally in balance in the non-ferrous subsector, but global overcapacity of approximately 15 percent (or 100 million tonnes) remains in the steel subsector.

CHART 3
TRADE PERFORMANCE
FERROUS METAL



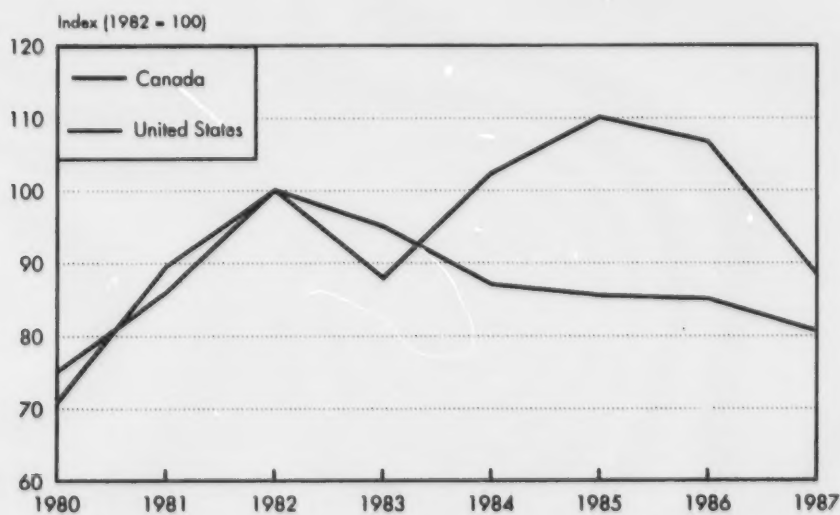
Source: SBID of DRI Canada.

CHART 4
PRODUCTIVITY PERFORMANCE, NON-FERROUS INDUSTRY
CANADA VS. U.S.



Source: S-BID of DRI Canada.

CHART 5
UNIT LABOUR COSTS, NON-FERROUS INDUSTRY
CANADA VS. U.S.



Source: S-BID of DRI Canada.

Standing back from cyclical profit and capacity fluctuations, performance can be measured by the ability to maintain or increase share of domestic and global markets; to maintain output relative to competitors; and to increase productivity faster than the competition. Profitability is also an important measure of performance, but can be misleading in traded commodity subsectors such as non-ferrous metal, as it often reflects commodity prices and exchange rates more than it does corporate performance.

By these measures, the non-ferrous subsector has been highly successful, and the steel subsector less so. While Canadian dominance of the non-ferrous subsector declined in the post-war period as new competitors from state-owned and newly industrialized nations emerged, Canada retained its position as a world leader in the subsector. Alcan, Inco, Noranda and Falconbridge remained dominant companies in their subsector, assuring international markets for Canadian primary metals.

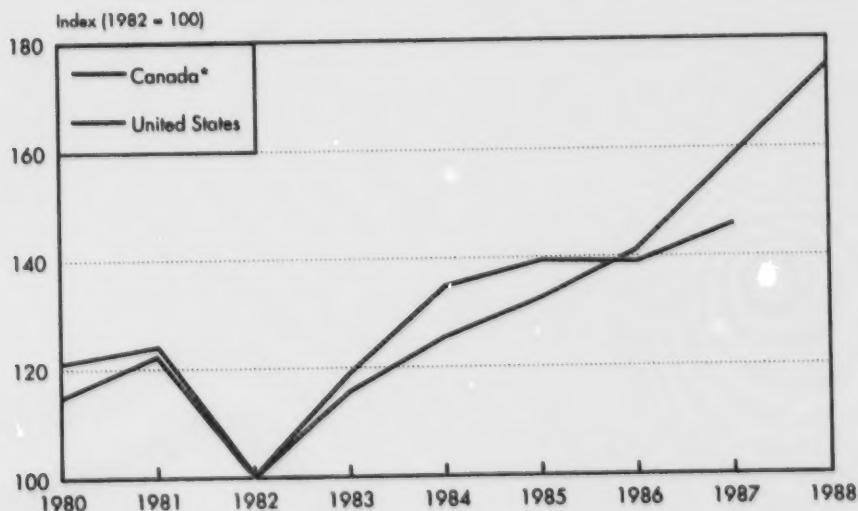
CANADA'S SHARE OF GLOBAL PRODUCTION: NON-FERROUS METALS

Nickel	24 percent
Zinc	14 percent
Aluminum	11 percent
Copper	6 percent
Lead	6 percent

Productivity performance in the non-ferrous subsector has been impressive, increasing 66 percent between 1982 and 1988, compared with 27.5 percent in the U.S. during the same period. Canadian cost of production of non-ferrous metals was among the lowest in the world during the 1980s.

The steel subsector has had a more mixed performance. The subsector's competitive position weakened compared with the U.S. during the 1980s, as measured by trade performance, productivity and unit labour cost growth. While the Canadian industry maintained its position as the primary supplier to the Canadian market, imports increased from 14 percent of the market in 1982 to almost 20 percent by the end of the decade. Declining domestic market share

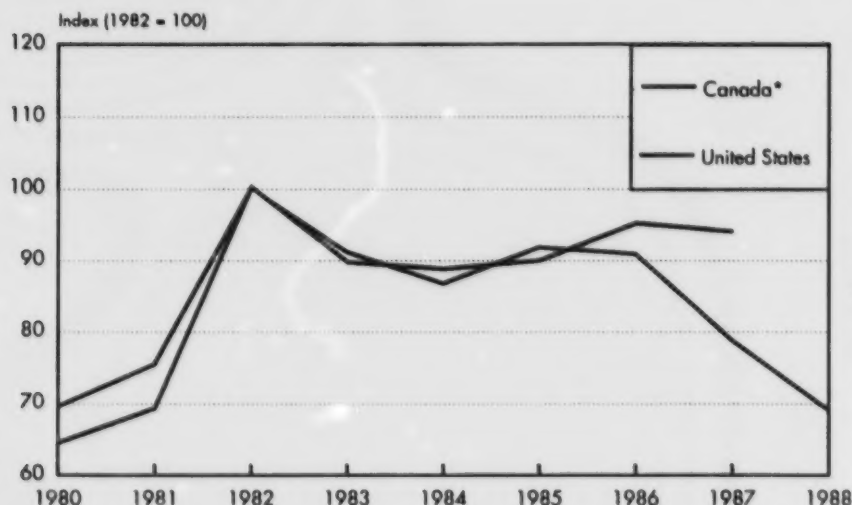
CHART 6
PRODUCTIVITY PERFORMANCE, PRIMARY STEEL INDUSTRY
CANADA VS. U.S.



*Canadian figures for 1988 are not available.

Source: S-BID of DRI Canada.

CHART 7
UNIT LABOUR COSTS, PRIMARY STEEL
CANADA VS. U.S.



*Canadian figures for 1988 are not available.

Source: S-BID of DRI Canada.

was not compensated for by increased exports, as Canadian producers restrained voluntarily exports to the traditional level of 3 percent of the American market. Steel exports to the U.S. from most other major exporters were limited by quotas assigned by U.S. authorities under their Voluntary Restraint Agreements (VRA) program.

Productivity performance increased 75 percent between 1982 and 1988 in the U.S., compared with 46 percent in Canada from 1982 to 1987. While unit labour costs declined in both Canada and the U.S., they declined at a faster rate in the U.S.

Profitability in both the ferrous and non-ferrous subsectors fluctuated following movements of demand during the 1980s, with profits in 1981 followed by losses, and recovery in the late 1980s. Profitability in the steel subsector has also been affected by labour disputes, with the industry suffering major strikes in 1981 and 1990.

Strengths and Weaknesses

In the non-ferrous subsector, low cost of production has been ensured by the availability of indigenous, high-quality raw materials (with the exception of bauxite for aluminum); low-cost energy; R&D; economies of scale; and access to highly skilled, cost-competitive labour. Underlying these strengths is secure access to world markets for smelted and refined products. A weakness of the subsector is that value tends to be added outside of Canada; this does not affect the competitiveness of most Canadian companies, however, because most are vertically integrated globally, with fabricating facilities in all major markets.

The steel subsector, in contrast, saw its relative competitiveness diminish during the 1980s, as competitors more rapidly eliminated excess capacity, reduced their labour costs and invested in new products and technologies. This took place despite investments of over \$5 billion by the industry in the 1980s. Underlying many of these weaknesses is an inability to reach foreign markets, due to restricted market access and high transportation costs.

Non-Ferrous Metals

The non-ferrous processing industry is built on the availability of raw materials and energy. Canada has an abundance of high-quality ores containing important co-products and by-products of non-ferrous and precious metals. The exception to this rule is aluminum: bauxite and alumina are imported from tropical countries. However, access to cheap and abundant electrical power is the most critical factor in processing aluminum, giving Canada a compelling competitive advantage. Other products processed using electricity, such as zinc and magnesium, also benefit from cheap hydro-electric power. In comparison, the U.S. relies largely on coal-burning utilities, which are under attack from environmentalists. Most metal producers own sources of raw materials, and frequently of energy, providing significant cost advantages and security of supply.

Raw materials provided the basis for the development of the Canadian non-ferrous smelting industry, but do not explain its continued success. Other countries have ore deposits and do not match Canada's cost competitiveness. Technology, economies of scale, and high-quality labour have been the other keys to cost competitiveness and product innovation. Canadian companies are leaders in non-ferrous metal mining and process and product technologies, resulting in productivity improvements and development of new alloys and product applications. The introduction of new processing technologies allowed Canadian companies to decrease employment by 10 percent, while output increased 50 percent during the 1980s, resulting in significant productivity improvements, superior to those of competitors.

Nevertheless, the renewal of mineral resources through exploration (critical to the future of the industry) is an area where government policies can have a significant impact. All companies are investing in environmental research to control emissions, particularly sulphur dioxide. Non-ferrous companies are investing in research in advanced industrial materials and composites. Sheritt Gordon is a world leader in hydrometallurgy and powder metallurgy, while Alcan is experimenting with new aluminum alloys. In total, expenditures on R&D by non-ferrous companies totalled 1.3 percent of sales in 1987, compared with 1.2 percent in the U.S.

The non-ferrous subsector obviously benefits from economies of scale, having among the world's largest producers. Scale permits both investment in highly capital-intensive new capacity and development of new technology. Canadian capacity has expanded or remained stable in the non-ferrous subsector, despite low global growth rates and new entrants. Most notably, aluminum capacity increased 45 percent during the past decade. A total of \$8.5 billion was invested in the non-ferrous subsector from 1982 to 1990, with a further \$5 billion to \$6 billion expected by 1992. The bulk of this investment has been for new aluminum smelters and modernization to meet environmental standards. Canadian smelting facilities are considered world-class.

This subsector has also benefited from the availability of highly skilled labour and competitive labour costs. Unit labour costs actually declined during the 1980s, with 1987 costs totalling only 81 percent of 1982 costs. The 10 percent reduction in the labour force that contributed to the industry's strong productivity performance also ensured a ready supply of skilled labour, except in certain specialized fields where a more forward-looking approach to recruiting is necessary. In this context, the industry has developed strong links with Canadian universities and community colleges, with the result that specialized programs have been established for training technicians, engineers and scientists. The industry's attractiveness as a career, however, is affected by the cyclical nature of the industry, with some decline in enrolments experienced in reaction to downturns (such as those in the 1980s).

Canadian non-ferrous producers have been successful in export markets because of low cost of production, and vertical integration with fabrication plants often located in other countries. Canadian companies have not concentrated on increasing the export of more fabricated products. While further fabrication would increase Canadian employment and output, it is not the preferred competitive strategy for globalized non-ferrous producers. Increasingly, production is taking place close to market to best serve customers. In addition, transportation costs and tariffs that favour less-processed materials discourage fabrication in Canada.

Among the most high-profile government policies affecting the non-ferrous subsector are environmental standards. New environmental regulations have required companies to spend almost \$1 billion in the past few years, particularly to meet sulphur dioxide emission standards. In the near future, it is likely that increasing expenditures will be needed to control acidic effluents from mines and tailings areas. In addition, a number of other measures are under consideration, including lead smelter regulations. Rather than seeing them as a source of competitive disadvantage, however, companies are using environmentally triggered investments to increase efficiency. In addition to the cost of meeting environmental regulations, there are overlapping provincial and federal jurisdictions and changing or unclear standards — all of which impose a burden on companies. However, the consultative process being pursued by environmental authorities shows promise of developing regulations that will be more straightforward as well as effective and reasonable in cost. Other government policies on interest rates and on investment decisions (such as those impacting on the cost of capital) substantially affect the industry.

Policies of other governments also have significant effects on this industry, particularly subsidies and trade barriers. Canadian government support for the non-ferrous subsector appears to be equivalent with the U.S. However, many of Canada's competitors are state-owned, by Chile and the Soviet Union, for example, the main competitors in the copper, nickel and aluminum industries. Government subsidization can lead to depressed prices and overcapacity, as occurred in the 1970s, exacerbating the cyclical nature of the industry. Tariff structures favour the export of ore and intermediate products rather than refined products. For example, Japan allows free entry of copper ores and concentrates, but levies tariffs of up to 7 percent on refined copper. Differential tariff structures have restricted the development of the fabricated metal sector in Canada, but have also had the effect of encouraging non-ferrous producers to become global competitors and establish fabrication plants abroad.

Ferrous Metals

The competitiveness of the Canadian steel industry has traditionally been built on low-cost production of commodity products, and on access to low-cost, abundant, quality raw materials and energy. However, during the 1980s, and despite significant productivity gains, these advantages were no longer sufficient to ensure continued competitiveness relative to more significant improvements made by major competitors. The American steel industry restructured and retired obsolete capacity, and the Japanese industry improved its product quality and mix while being supported by a profitable domestic market.

Forced to restructure by the recession and severe losses, the American steel industry shed 25 percent of its obsolete capacity and 55 percent of its jobs during the 1980s. In comparison, capacity in the Canadian steel industry remained stable, while employment declined 20 percent. American unit labour costs dropped as a result of the massive restructuring (declining relative to Canadian costs), while productivity increased more in the U.S. than in Canada.

Canadian processing costs were also adversely affected by the quicker adoption of low-cost mini-mill technology in the U.S. Mini-mills enjoy lower production costs because they use only recycled scrap, rather than ore, resulting in significantly lower capital and processing costs. Mini-mills make economies of scale less critical, and permit production of smaller runs of specialized products, closer to local markets. Approximately 30 percent of Canadian production was supplied by mini-mills by the end of the 1980s. However, rather than expand in Canada, some Canadian mini-mill producers built mini-mills in the U.S., or acquired fabrication facilities in the American market to escape non-tariff barriers, and get closer to markets. This strategy is quite different from that of the integrated steel producers who maintain almost all of their production and fabrication facilities in Canada.

The steel subsector made significant investments (\$5.4 billion) in the 1980s to both improve efficiency and meet environmental standards. These included new casters, the installation of electric arc furnaces, new and improved rolling facilities and the installation of new galvanizing and cold-rolling facilities. At the same time though, other changes were happening, particularly in the U.S. The VRA program limited imports assisting the U.S. steel industry; the U.S. government's Pension Benefit Guarantee Corporation assumed substantial pension liabilities from some steel companies, effectively lowering their costs; changed tax rules in the U.S. in the early 1980s permitted steel companies to use tax credits that would otherwise lapse; Chapter 11 bankruptcy provisions allowed firms to restructure, protected from creditors; and the United Steelworkers negotiated wage concessions with many integrated American producers in an attempt to maintain jobs and help firms survive. The result was that during the 1980s many U.S. steel companies cut drastically their labour force, improved labour productivity, dropped marginal product lines and closed entire mills. Therefore, the degree of restructuring and investments made by the steel industry in the U.S., plus the continual appreciation of the Canadian dollar since the mid 1980s, meant that the Canadian investments did not create the competitive advantages anticipated.

As cost competitiveness declined, the Canadian industry was not able to compensate by moving into other high-value product areas such as fabricated or specialized products, but remained largely a producer of commodity steel. Concentration on commodity products reflects low spending on R&D, and limited demand for high-value-added products, given the size of the Canadian market and restricted access to foreign markets.

The Canadian steel industry is not an innovator in product and process development, spending only 0.3 percent of sales on R&D, compared with 3.5 percent in Japan, and 0.6 percent in the U.S. The Japanese are clearly the world leaders in developing specialized products, such as specialty steels for the automotive market. In contrast, Canadian producers usually move more carefully into more high-value-added products (after demand for such products is

demonstrated), and utilize the expertise of other steel producers to establish such facilities. Investments are only now being made in specialized galvanized steels, in cooperation with Japanese companies, and at the insistence of customers (notably in the automotive sector).

On the other hand, Japanese steel companies are becoming materials companies, spending up to half of their R&D budgets on materials other than steel. Meanwhile, in Canada, a major steel company recently turned away from a strategy of diversifying into other materials. It sold its ownership interest in a plastics company in order to concentrate on its core business — making steel.

While access to trained labour is not a major issue in the steel subsector, except in certain specialized areas, labour-management disputes have periodically ended in prolonged work stoppages, with resulting loss of market share and profitability.

Diversification into specialty products has been impeded by global trade barriers, primarily non-tariff measures. In the EC, practices dating back to the 1950s severely limit access of non-EC based producers to the community market. A document produced by the EC as background to *Europe 1992* admits "there is little prospect that much, if any, Canadian steel will find its way into the highly protected EC market."

Steel imports to the U.S. from most countries are constrained by the U.S. VRA program. While the Canadian industry has not been subject to this program, its exports have been voluntarily maintained at Canada's traditional market level of 3 percent of the American market. Since approximately 20 percent of all Canadian steel shipments go to the U.S., the Canadian industry is vulnerable to dumping and countervail actions initiated by American producers. While these are actions usually aimed at Japanese and European producers, Canadian producers may be caught up in such cases. Industry concerns of such cases being initiated are growing, as American producers prepare for the phase out of VRAs in March 1992. The Canadian industry continues to press the federal government to pursue discussions with American authorities to develop a substitute system of rules in both countries to be used in anti-dumping and countervailing duty actions arising out

of Canada-U.S. trade. Such discussions are provided for under Chapter 19 of the FTA, and their successful conclusion is viewed by the industry as reducing or eliminating the risk of trade actions taken by U.S. industry against Canada.

The primary domestic policies affecting the steel industry are environmental standards and liabilities; tax and investment policies; interest rates; and federal-provincial overlaps. Environmental standards are demanding, but are no more onerous than those required in the U.S.

Outlook for the 1990s

The non-ferrous metals subsector is situated to maintain its position as a leading global competitor in the 1990s, based on its cost competitiveness and strong R&D. This means new products and processes, and integration into world markets. Global demand will grow modestly during the 1990s, with strong growth expected only in the aluminum industry. Room for growth in high-value-added products is limited, as globalized companies conduct fabrication close to markets. Canadian companies can be successful without expanding fabrication activities in Canada. In the long term, however, the subsector may be affected by increased use of recycled and substitute materials, limitations on use of certain metals such as lead (due to toxicity), and possible adjustments in sourcing ores. The result could be to decrease the importance of current competitive advantages and to encourage the industry to put more emphasis on innovative ways of increasing its competitiveness.

The steel subsector faces a period of adjustment. The industry does not have the same compelling competitive advantages against competitors that it used to have, because the American industry restructured and modernized during the 1980s, while the Japanese industry moved into specialized high-value-added products. There are industry fears that shrinkage in the Canadian manufacturing base will lead to a reduction of the critical domestic market. Canadian producers are prevented from supplying customers who cross the border, because they fear American trade action should Canadian exports to the U.S. increase. In addition, Canadian producers have few alternative markets, due to restricted market access.

The integrated mills could be particularly vulnerable because they are being challenged by the significantly lower-cost mini-mill producers on a widening range of products. The short-term result has been record losses for the integrated steel producers that, in some cases, threaten their survival. In the medium term, capacity reduction and product rationalization among the integrated producers will be inevitable.

A Sectoral Agenda for International Competitiveness

Critical issues to be addressed by the ferrous and non-ferrous metals sector in the 1990s include access to markets; climate for investment; use of R&D to increase productivity and move into new product areas; management of human resources; and the impact of domestic policies and regulations. In addition to issues presented by these building blocks of competitiveness, the steel subsector faces the problem of responding to continuing global overcapacity and new entrants. In response to the severity of the problems facing the steel industry, a federal government task force on the steel industry was recently formed to address adjustment issues facing the industry. The task force comprises steel producers, labour, major customers and several federal government departments. Among the issues being examined are employment prospects, increasing imports, and gaining improved access to the American market.

Market Access

Maintaining market access is vital to the future development of the metals-processing sector, in particular the steel industry. Exporting steel products to the EC and Japan is virtually impossible, due to non-tariff barriers, while the steel industry has voluntarily limited its U.S. exports. Canadian producers are extremely vulnerable to trade harassment from American producers who use anti-dumping actions to control the volume of steel imports. These Canadian producers are pressing for agreement on common trade remedies under Chapter 19 of the FTA. In the non-ferrous subsector, Canadian producers are discouraged from exporting fabricated metals because of the tariff structures in Japan and Europe.

Changes in multilateral tariffs are being negotiated through the Uruguay Round of the GATT, and the issue of access to the American steel market will become increasingly important as the U.S. begins negotiating changes to the current VRAs, which expire in March 1992.

Investment

As industries globalize, a competitive investment environment is becoming as critical as access to markets. Both the ferrous and non-ferrous subsectors are capital-intensive, and the cost of capital is one of the most important determinants of investment, along with availability of cheap energy and skilled labour. As globalized companies need to raise capital to maintain and expand their presence in world markets, the factors influencing the availability and the cost of capital become increasingly important when determining future investments.

Research and Development

As the use of recycled and engineered materials grows, advantages of resource availability will diminish and research into new materials and processes will become more critical to remaining competitive. Productivity improvements, particularly those based on environmental solutions, are a major issue now, especially for non-ferrous companies. Providing sufficient support for R&D that is consistent with industry's needs, by adapting or developing technology, possibly through increased use of joint ventures, can help to improve product mix and process efficiency.

Human Resources

The sector does not suffer from a large shortage of skilled workers, due to the industry's traditional strength in Canada. However, continual downsizing during the 1980s has made labour-management relations more confrontational, particularly in the steel subsector. The introduction of more innovative labour-management relations would foster greater cooperation.

Domestic Policies

The cost of meeting environmental and other regulatory standards, particularly to the non-ferrous subsector, is often a burden not shared by competitors in other countries. Overlapping government jurisdictions and newly evolving standards and societal expectations, without regard to the cost of implementation by Canadian companies, need to be taken into account in terms of non-Canadian competitors through the establishment of better consultative mechanisms by all concerned parties.

FABRICATED MATERIALS

THE FABRICATED MATERIALS INDUSTRY, FOR THE PURPOSES OF THIS ANALYSIS, consists of those firms that process plastics and metal into intermediate or finished products. Plastics products include foamed products, pipe, film and sheeting, bags and containers. The principal markets are packaging, construction, automotive, furniture, and electrical/electronics. Fabricated metal products include wire, structural steel, architectural products, stamped and coated products, hardware, and closures and containers. The principal markets are construction, packaging, durable goods, automotive, and aerospace and defence.

Structure

The industry is characterized by a large number of small, entrepreneurial Canadian-owned firms, and a few large firms, about two thirds of which are Canadian-owned. Most of these firms were established to supply domestic demand. With a few exceptions, the industry remains fragmented. Corporate concentration exists to some degree, with 20 percent of the firms accounting for about 70 percent of the value of shipments, and most of the exports. Some segments of the industry have consolidated, such as metal closures and containers, plastic pipe, extruded profiles and film. While competition is on a North American basis, the largest Canadian firms are much smaller than their U.S. counterparts.

Firms in this industry tend to locate close to their customers, due to the need to minimize transportation costs and to provide customer service; 60 percent of the industry is in southern Ontario, 25 percent is in southern Quebec, and most of the balance is in western Canada.

The small firms typically employ fewer than 50 people, have annual sales of \$5 million, and concentrate on specific products and processes. These small firms are lean, and minimize overhead in order to remain competitive. Out of perceived necessity, most firms have diverted resources away from activities having a long-term focus, such as R&D and training.

The industry is domestically oriented, with exports accounting for approximately 15 percent of shipments. Imports account for about 25 percent of the domestic market. The U.S. is the destination of 90 percent of exports and the source of 75 percent of imports.

Suppliers to the industry are generally large, multi-national material and machinery manufacturers.

Customers also tend to be large (e.g. food processors, automotive, building products wholesalers, consumer goods retailers). The fabricated materials firms are sandwiched between these large suppliers and customers, and thus have little bargaining power. The industry has traditionally relied on suppliers of materials and machinery to provide most of the product and process R&D. As a result, few firms have any technological competitive advantage.

Depending on the application, plastics and metal products compete with each other and with paper, wood, glass, lighter-weight metal alloys and composite materials. Much of the plastics growth during the past 20 years can be attributed to displacement of metal products.

Performance

The real growth rate of the fabricated materials sector has roughly kept pace with that of the economy during the past two decades, but, within this sector, metal products have steadily lost ground, while growth in plastics has been strong.

Most of the growth in the plastics sector has been in new firms, aided by the fact that the barriers to market entry are low. Growth within the metals sector has resulted largely from expansion of existing firms. In both cases, however, the Canadian industry has failed to achieve productivity gains that match U.S. gains. This failure is compounded by the reported faster growth in real wage rates in Canada, which can be linked primarily to the relative strengthening of the Canadian currency since 1987. Lower Canadian unit-labour cost increases in the metal products sector, compared with U.S. increases, were balanced by a rise in the value of the Canadian dollar.

The following table presents an overview of the size of the two sectors of the industry in 1989 (as defined by Statistics Canada), and their performance during the 1980s.

	Metals	Plastics
Shipments, \$billions	18.6	6.1
GDP, constant 1986 \$billions	6.7	1.9
Average annual change (81-89), percent	1.0	5.8
Contribution to GDP of economy, percent	1.3	0.4
Average annual change (81-89), percent	-2.6	2.2
Exports, \$billions	2.6	1.1
Exports as percent of shipments	14.0	17.6
Imports, \$billions	4.6	2.0
Imports as percent of domestic market	22.3	28.6
Profitability (return on assets), percent	10.2	n/a
Employment, 000s	169	51
Average annual change (81-89), percent	3.5	5.7
Labour productivity		
Average annual change (82-87), percent		
Canada	2.3	2.9
U.S.	3.2	n/a
Unit labour cost		
Average annual change (82-87), percent		
Canada	0.9	1.8
U.S.	2.0	n/a
Canadian share of U.S. market, 1988, percent	1.1	1.2
Average annual change (82-88), percent	10.6	19.3
U.S. share of Canadian market, 1988, percent	16.1	22.3
Average annual change (82-88), percent	3.6	3.9

Imports since 1975 have remained fairly constant at about 25 percent of the Canadian market. Exports accounted for only 5 percent of shipments in 1975, but grew to about 15 percent by 1989. The Canadian share of the U.S. market grew rapidly between 1982 and 1988, albeit from a small base. The U.S. share of the Canadian market grew much more moderately during that period. The growth in exports can be attributed to several factors, including:

- the relative levels of the Canadian and U.S. dollar during the period;

- consolidation of some domestic producers, allowing for the attainment of competitive scale of operation; and
- a tariff structure that encouraged shipment of plastics (rather than resin) products into the U.S.

Performance Since 1988-89

While hard data are not available in most cases, from anecdotal information it is evident that the industry is undergoing a difficult period. Capacity utilization is running at about 60 percent, compared with levels above 80 percent for much of the 1980s. It is believed that the current situation reflects the combined effect of the recession and underlying structural changes driven by globalization. Most of the structural change observed to date has occurred among customer firms located in Canada, and there has been little evidence of restructuring within the fabricated materials industry.

Strengths and Weaknesses

Many factors influenced the growth of the materials sector in the 1980s. Most important was the unprecedented economic growth following the 1981-82 recession, which demonstrated strength in all of the key market segments — packaging, construction and transportation. Against this backdrop, however, circumstances influenced growth in materials sectors.

In the mid 1980s, a comparative-cost study suggested that Canadian plastics processors had a 15 percent cost advantage over U.S. competitors. The industry believes that much of this advantage has eroded, largely because of the increase in the value of the Canadian dollar relative to the U.S. dollar since that time.

Raw materials are readily available, but prices are often higher than in the U.S. Even raw materials produced in Canada are often more expensive here than in the U.S., since they are frequently sold at the international price, plus tariffs, transportation costs and higher unit costs based on volume of purchase. Despite this, the domestic supply of plastics resins increased markedly since the late 1970s. This provided improved availability of raw materials, and a greater level of technical support from resin suppliers to plastics processors.

In many applications, plastics displaced traditional materials (such as metal and paper) due to the inher-

ent performance advantages of plastics, including superior processability, light weight, chemical inertness and ease of fabrication. Changing consumer lifestyles, including growing demands for convenience and tamper-resistant packaging, have also fuelled the growth of plastics materials.

Trade policy, as it applied to the value-added stream from resin suppliers to plastic products customers, also played an important role in the growth of plastics processing in Canada, and explains much of its current structure. The availability of competitive feedstocks, particularly natural gas, encouraged the growth of multinational investment in resin production in Canada. These materials faced high tariffs (10 to 12 percent) into the U.S. market. Processed plastics products, however, faced much lower tariffs when exported to the U.S. (3 to 5 percent). Resin suppliers, therefore, had significant incentive to export their materials as processed goods in order to minimize tariff exposure.

Canadian tariffs and non-tariff barriers during the 1980s supported the growth of a broad domestic customer base, providing a ready market for Canadian firms. While a trade deficit in fabricated materials continued throughout the 1970s and 1980s, many of the imports comprised classes of goods that were not produced in Canada, and therefore were not in competition with domestically produced goods.

This situation fostered a fragmented, small-plant structure within the industry. Fewer than 10 percent of Canadian plants employ more than 100 people, compared with 25 percent in the U.S. The small size of Canadian markets compared with the U.S., and the focus on domestic customers, fostered the development of small firms. In some instances, the familiarity of small Canadian firms with short-run manufacturing techniques provided them with a degree of flexibility that represented an advantage when compared with long-run U.S. operations. The few circumstances where companies grew to more internationally competitive size can largely be attributed to their emphasis on products that could be transported economically to larger U.S. markets (such as plastic pipe, film and extruded profiles, and specialty metal containers). In these cases, large companies tended to be multi-plant operations where individual plants were often only medium-sized, but the company gained competitive scale in the purchase of raw materials (50 to 75 percent

of input costs) through aggregate purchasing, and the application of (often) proprietary technology.

Throughout the 1980s, competitive, if not necessarily leading-edge technologies, were generally available, primarily through materials and machinery suppliers. Most Canadian firms employ technologies that are competitive with similarly sized U.S. firms, but are behind the larger U.S. firms in the use of automated materials handling and quality control. Many of the more successful firms use in-house engineering to expand standard technologies into a competitive advantage, but by the end of the decade only an estimated 10 percent of plastics firms employed a staff engineer, and R&D expenditures were typically one sixth of the level realized in the U.S., Japan and Germany. This reflects a preference to buy off-the-shelf technology rather than undertake in-house R&D.

The plastics sector has had limited impetus to develop a skilled technological or managerial workforce. The industry has relied on a few key skilled staff and a large number of unskilled workers with high turnover rates. In-plant training is limited, and appropriate education and training programs are few and embryonic. The metals sector is increasingly demanding more highly skilled, multidisciplinary workers. Firms are having to provide in-house training to update and upgrade the skills of their employees, many of whom are community-college graduates.

Due to the entrepreneurial nature of many firms in this industry, there tends to be a lack of professional management, and limited attention is devoted to strategic planning. Firms, instead, react to market conditions. It may be that there simply has not previously been any incentive for small companies to focus beyond their immediate markets. Today, however, owner-managers are often forced to make rapid decisions outside of their areas of expertise, and so the success or failure of their businesses is related to their ability to think and act strategically. The largest firms are accustomed to taking a more global view of the industry, and possess a wider array of expertise to assist in the decision-making process.

There are few significant interprovincial trade barriers affecting the industry. However, the metal-can industry is influenced by interprovincial restrictions, particularly in servicing the beer industry. Some exports to the U.S. are adversely affected by building code differences and "Buy America" practices.

Outlook for the 1990s

The 1990s present a business environment very different from that of the 1970s and 1980s. The major challenges are both market and policy driven. Global trade liberalization is irreversibly altering the competitive environment that fostered growth in the 1980s. Increasingly sophisticated design and use of new materials, including composites and ceramics, will have an impact on the industry. Growth in demand for plastics will slow somewhat as opportunities for replacement of other materials become harder to identify. Waste-management concerns will lead to conservation strategies that favour materials offering greater reuse and recycle potential.

The FTA provided for a five-year tariff elimination on plastics resins, compared with a 10-year schedule for processed goods. As a result, multinational resin suppliers have reoriented to compete more effectively on a North American basis. Canadian-based resin companies no longer have the same incentive to export their materials to the U.S. via Canadian plastics processors. Canadian processors will, in future, have to compete more directly with U.S. firms for competitive materials contracts and access to resin company technology.

The phase-out of tariffs on imported cold-rolled steel will tend to reduce the Canadian price of this important raw material, with a beneficial effect on the international competitiveness of the fabricated metal-products sector.

As tariffs drop, many fabricated materials end-users are consolidating their businesses on a North American scale. Using the food processing industry as their model, these firms are eliminating high-cost operations, many of which are in Canada. Shifting of food packaging to the U.S. has eroded some of the traditional customer base of Canadian firms.

Increasingly, it is becoming apparent that consolidation among suppliers and customers will result in changes to the traditional supply agreements within the industry. It is also apparent that supplier-customer relationships are becoming much more exclusive than they were, with major raw materials companies favouring fewer, larger customers (including distributors), for which they will provide a higher level of technical service and support in exchange for large, long-term contracts. Similarly, as was the case in the automotive market, major customers of

fabricated materials are splitting their contracts between two or three major firms. In exchange, the fabricated materials firms must offer improved pricing, and assume additional responsibilities in areas such as inventory management and product development. The synergy in such a strategy comes from reduced costs for sales, administration and technical service throughout the value-added chain.

Small firms, as a result of this consolidation, will have difficulty participating in the major account segment of the industry, and will either disappear, be acquired or be relegated to servicing niche markets or small accounts. Consolidation is essential to the competitiveness of the materials processing sector for a number of reasons, including: achieving sufficient size to negotiate favourable raw materials contracts; gaining preferred access to supplier technology; and expanding capacity for technology development and implementation.

A threshold size is necessary before firms can support meaningful in-house development. For the plastics sector, this size is estimated to be about \$15 million per year in sales, roughly triple the current average size of domestic firms. Increased innovation is further hampered by a severe shortage of experienced engineering personnel. Historically, much of this demand has been satisfied through immigration. As immigration patterns have changed, this source has all but evaporated, and the industry has been unsuccessful in presenting itself as an attractive career option for skilled Canadians. It is becoming increasingly important to have some innovation capacity to adapt new technologies, to differentiate products, and to respond to customer demands. This is a human resources problem that has to be addressed, and some firms are taking the initiative in that direction.

In this decade, it will be increasingly necessary to adopt a North American market orientation. The obstacle to be overcome is getting firms to recognize that they need to take a broader view of their industry and develop a greater awareness of events occurring beyond their immediate markets.

Small firms specialize on a narrow range of processes and products. As competition from the U.S. increases, some of their domestic markets will be eroded. Canadian manufacturers will therefore need to reassess their approach. Some products cannot be transported long distances, and so, in this case, markets have a measure of protection. In other cases,

producers will need to implement cost-reduction strategies or offer higher levels of customer service to offset slightly higher prices. As domestic market share decreases, these companies will have to look at expanding their geographic penetration into the U.S. in order to continue to grow. Companies are starting to deal with demands for lower price and higher quality in products and services, but some are experiencing difficulty.

The dominant regulatory issue facing the industry is the contribution of materials to the solid-waste stream. The costs of environmental regulation will soon be an unavoidable aspect of doing business. At the same time, innovation arising from a demand for environmental compliance offers a significant opportunity for firms to develop a competitive advantage in international markets. Industry is taking a forward-looking role on environmental issues through the formation of bodies such as the Environment and Plastics Institute of Canada (EPIC). Packaging has been singled out first, driven by the federal government's National Packaging Protocol. The industry is concerned about losing market share to other packaging materials, such as paper and glass. The plastics sector, in particular, must improve consumer awareness of its attributes as a packaging material, because recent material selection decisions seem to have been based more on emotional response than on scientific evidence. To avoid distorting international competitiveness, the industry is urging government to move in unison with the U.S. on environmental issues.

Industry sources have expressed concern that a costly tax structure at all levels of government, and social costs related to legislation on labour relations, pensions and insolvency are increasingly placing small Canadian business at a competitive disadvantage.

A Sectoral Agenda for International Competitiveness

Markets and Marketing

From its domestic base, the industry must expand into North American, and, in some cases, global markets. Also changing are the traditional relationships between the fabricated materials industry and both

its suppliers and customers. Industry, in seeking to achieve increased competitiveness, should:

- aggressively seek new products, specialized product lines, improved quality and enhanced customer service, to market on a North American and international scale;
- secure preferred access to, and seek mutually beneficial commercial opportunities with, important suppliers and customers;
- seek marketing alliances to obtain advantages of scale; and
- recognize the fundamental changes arising from globalization, including:
 - the rapid change from domestic markets to North American and global markets;
 - options for creating new markets (e.g. export development, joint ventures and alliances); and
 - the growing importance of linkages to suppliers and customers.

Technology

Increasingly, the competitiveness of companies is determined by how well they exploit a technological advantage. Recognizing the importance of innovation, industry should:

- place greater emphasis on new materials, and designs incorporating them, when producing new products;
- develop improved production methods;
- incorporate environmental considerations into products and processes;
- increase in-house R&D and explore opportunities to leverage this investment through strategic technical alliances; and
- implement Total Quality Management, information technologies and automated manufacturing techniques.

Human Resources

More effective use of human resources is central to enhancing the productivity, and thus the competitiveness, of industry. A concerted effort by industry, labour, educational institutions and the federal government is needed to implement the necessary skills-development programs, including:

- institutional learning programs to increase long-term availability of professional and production workers;
- seminars to broaden the skills of senior management; and
- in-plant training to raise shop-floor productivity.

Business Climate

In consultation with business, labour and other interested parties, the federal government must provide a legislative and policy framework that enables industry to compete effectively in Canadian, North American and global markets. Such a framework may include the following elements:

- competition policy supportive of orderly consolidation within the industry to meet the need for larger, more-capable firms;
- elimination of interprovincial trade barriers to create a unified Canadian market;
- international harmonization of product regulations and standards to enable Canadian producers to gain access to global markets;
- internationally competitive fiscal and monetary policies, having regard for fiscal needs to support social programs;
- environmental policies based on the concept of sustainable development in the international context; and
- labour relations and employment legislation (pay equity, employment equity, job loss protection, pension reform, etc.) that recognizes the constraints existing within small and medium-sized businesses.

OVER THE PAST FEW YEARS, THE CANADIAN INDUSTRIAL EQUIPMENT SECTOR HAS undergone significant restructuring, primarily as a result of market shifts in the resource-based industries that are the significant portion of the sector's client base. Factors related to productivity, product quality and the application of new technologies have also had an impact on the international competitiveness of the sector. In particular, the development and application of microelectronics and informatics technologies, along with new and innovative management approaches and systems, have driven the development of Advanced Manufacturing Technologies (AMT) worldwide. AMT applies to existing industrial equipment producers, and has led to the recent growth of a significant AMT industry, one with tremendous growth potential.

Structure

The sector comprises a number of different types of industries, including manufacturers of equipment for agriculture (heavy tractors), forestry (skidders), pulp and paper (chippers), mining (drilling rigs), construction (graders), material handling (fork-lift trucks), metal rolling mill and welding, oil and gas, food service, packaging, machine tools and tooling, plastics and rubber (injection-moulding machines), and marine and ocean uses (marine robotic vehicles). It also includes the AMT industry, which involves both software (factory software, system design, CAD/CAM) and hardware (robotics, automated assembly systems, vision systems). Typically, Canadian production by both large and small companies is limited to a narrow range of equipment, and tends to focus on custom-engineered machinery. Industrial equipment manufacturers are concentrated in Ontario and Quebec, and to a lesser extent in Alberta and British Columbia.

The majority of companies in the sector are small and owner-operated. While the sector can be characterized as Canadian-owned, in most industries there are large foreign-based multinational enterprises (MNEs) that can be expected to continue playing an important role in determining the performance and direction of the industry.

In 1990, it was estimated that the sector had in excess of 2 500 establishments, employing about 84 000 people in skilled and semi-skilled positions. In the same year, the sector had shipments of some \$10 billion in current dollars, of which 61 percent, or \$6.1 billion, were exported. However, with imports of \$16.4 billion in a Canadian market estimated at

\$20.3 billion (import penetration of 81 percent), it is evident that Canadian manufacturers rely heavily on foreign industrial equipment suppliers. Historically, our principal trading partner has been the U.S., with 71 percent of Canadian export going to that country and 72 percent of Canadian imports of industrial equipment coming from it. The following chart provides tombstone data on the sector, and illustrates how it is rationalized on a North American basis with significant intra-industry trade between Canada and the United States.

CANADIAN INDUSTRIAL EQUIPMENT INDUSTRY

Employment	84 000
Shipments	\$10 billion
Exports	\$6.1 billion
Imports	\$16.4 billion
Imports as percentage of domestic market	81
Exports as percentage of shipments	61
Exports to U.S. (percent)	71
Imports from U.S. (percent)	72

Performance

The diversity of industries comprising this sector does not allow for an examination of its competitive performance on an industry-by-industry basis. Consequently, discussion is focused at the macro level. The strengths and weaknesses outlined may not apply to every subsector. Where appropriate, the sector is analyzed from two perspectives: larger, mostly foreign-owned, MNE mass producers (with narrow product lines), and smaller, Canadian-owned specialized producers.

The sector cannot be compared directly with its U.S. counterpart because U.S. statistics include computers as well as industrial equipment, and computers make up approximately 25 percent of the category. Basic statistics such as shipments, imports and exports can be extrapolated, but comparing labour costs, productivity, profitability and other ratios could be misleading.

In order to provide some perspective on the state of the sector, it is useful to examine The Machinery Program, which has been in place for more than 20 years. The Program came into effect in 1968, as part of a tariff realignment negotiated by Canada in the Kennedy Round of GATT negotiations. It provides that the duty otherwise payable on goods classified under qualified tariff items may be remitted if such goods are not available from production in Canada, and when this is in the public interest.

The objective of the Machinery Program is twofold. First, it encourages efficiency throughout all sectors of Canadian industry by enabling them to acquire from another country, duty-free equipment not obtainable from Canadian production. Second, the Program gives Canadian machinery and equipment producers tariff protection on the machinery and equipment they produce — in short, some protection in the domestic market.

Historically, total annual imports of tariff items covered by the Program approximated \$7 billion, of which about \$4 billion (57 percent) were duty-free under the remission provisions of the Program.

When the Program was started, the federal government recognized that the sector could not satisfy the total Canadian demand for a broad spectrum of machinery and equipment because the domestic market was too limited to allow economies of scale in production. Over the years, the sector has evolved into one that serves only those market segments or niches in Canada and abroad in which it can competitively (albeit behind high tariffs) manufacture products, these generally being in areas where custom design and engineering are important. Because of the strategy pursued by Canadian industry, there are significant gaps in Canada's machinery and equipment manufacturing capabilities. Those gaps appear in the

statistics, generally in products where production economies of scale cannot be achieved in the domestic market. These gaps are likely to be further emphasized as industry adapts to the effects of increasing internationalization of markets by narrowing the range of products manufactured, thereby obtaining greater concentration of effort and further economies of scale.

Between 1981 and 1988, total employment declined by almost 2.5 percent per year, total shipments decreased by approximately 1.5 percent per year (in real terms), and investment declined by 0.15 percent (in real terms). The profitability of the sector fluctuated from a low of 3.4 percent in 1983 to a high of 9.4 percent in 1988. These figures suggest that the sector went through a significant adjustment and rationalization period, and that the trend will be continued movement toward the sector becoming more highly specialized and rationalized. As a result of these adjustments, certain industries will likely be positioned to take advantage of the opportunities that will appear when the North American economy rebounds in the near future.

The sector's total factor productivity (the overall efficiency of all inputs in the production process) declined, on average, by 1.1 percent per year between 1980 and 1986. In addition, unit labour costs during the same period increased by 7.8 percent, faster than did the Canadian economy as a whole (5.9 percent). This lacklustre productivity performance — combined with high wage increases — cannot be sustained in an increasingly competitive international environment.

Strengths and Weaknesses

The industrial equipment sector has several strengths that enable it to compete in the domestic and international marketplace. And these strengths exist despite the small size of the Canadian firms involved. The AMT and the plastics processing machinery industries are typical examples of businesses that are identifying niche markets in Canada and worldwide, and providing specific products to satisfy demand.

The Competitive Edge

One of Canada's competitive advantages in this sector is the flexibility of the majority of its firms. This flexibility enables firms to rapidly identify and exploit market niches, and to respond quickly to the individual requirements and specifications of customers. This strength has resulted in considerable expertise in such areas as specialized machinery for use on large farms under dryland prairie farming conditions; versatile earth-moving machinery for the construction industry; forest harvesting equipment; plastics injection-moulding machinery and moulds, automated assembly systems; marine remotely operated vehicles; and special oceanographic instrumentation.

Realizing that the Canadian market is not of sufficient size to support a multitude of full-line equipment manufacturers, and, further, that it is not economic to compete directly in world markets against the large multinational firms, Canadian-owned firms in this sector have identified such worldwide market niches as those noted above. The Canadian-owned firms have developed products to exploit these market niches. This competitive strategy has proven effective during the last two decades as numerous small Canadian firms have become significant world-class players in their particular niche. Examples of these companies are Husky Injection Molding Systems Ltd. (plastics injection moulding systems), Champion Road Machinery Ltd. (road graders) and Thordon Ltd. (composite marine bearings).

The sector's second competitive advantage is its ability to custom design equipment and machinery. This enables the sector to adapt to changes in customer requirements much more quickly than the large multinationals can, with their long production runs and multitude of product lines. This *one-off* ability to custom design to client specifications has been effective in establishing Canadian beach-heads in markets traditionally served by foreign competition.

Canadian industry developed these strengths and capabilities despite being faced with several major challenges, such as high levels of foreign ownership, limited R&D conducted in Canada, unavailability

of necessary skills within the Canadian labour force, and the cost of capital for acquiring technology and modernizing plants.

Foreign Ownership

Foreign ownership has had an impact on this sector. There is a high level of foreign ownership in the manufacturing industries that constitute the client base for this sector. As a matter of corporate policy, these foreign subsidiaries in Canada tend to purchase their equipment from the same supplier as their foreign parent company, usually a non-Canadian one. This truncates an already limited Canadian market. Furthermore, as a matter of corporate policy, these foreign subsidiaries can act as a single-source supplier, but the major part of their product lines are supplemented by production from the parent firm. Accordingly, the subsidiaries expend little effort expanding production in this country. Canadian manufacturers are limited to providing the specialized products that they produce, and, consequently, are unable to offer *one-stop shopping*.

Nevertheless, foreign ownership does benefit Canada in indirect investment, job creation, expanded product lines and (in most cases) worldwide access for Canadian-produced goods that are manufactured by foreign-owned subsidiaries.

Research and Development

In addition to high levels of foreign ownership, the industrial equipment sector suffers from a lack of domestic R&D. There appear to be two main reasons for this: foreign ownership of the major firms within the sector, and the small size of firms in general.

Canadian subsidiaries of foreign-owned companies obtain sophisticated technologies from their parents and consequently conduct little or no R&D in Canada. In 1987, R&D conducted by foreign-owned firms amounted to only 1.6 percent of sales, versus 4 percent by Canadian-owned firms. In addition, foreign-owned firms accounted for only 17 percent of total R&D conducted in the sector in 1987, down from 43 percent in 1982. The type of R&D performed by subsidiaries operating in Canada tends to be development or adaptation of the parent companies' technology to Canadian market conditions.

The small size of Canadian firms restricts their ability to conduct meaningful R&D. Rather than committing to strategic R&D programs, Canadian firms use their expertise to develop existing concepts to meet customer specifications. These firms typically lack requisite personnel and financial resources, and, as a result, their R&D activity is generally limited to enhancing individual pieces of machinery and equipment rather than new and innovative products.

Skills Shortage

Competitiveness in this sector depends upon the quality of the work force. Since World War II, the sector has relied on skilled immigrant labour from European countries having a tradition of excellence in the metalworking trades. This source diminished significantly in the 1980s as the European living standard improved, and as more-restrictive Canadian immigration policies were enacted. During the last decade, not only were there technological advances in manufacturing processes, there was a marked increase in the need for workers with appropriate computer skills. Unfortunately, these skilled workers are not available in Canada.

The sector is experiencing a shortage of skilled labour at the shop-floor and the computer-technologist level. Because the sector relied so heavily on skilled immigrant labour, it did not build the requisite infrastructure to provide training. Industry analysts predict that by the end of 1991 there will be a shortage of 2 000 skilled workers in Ontario's machinery and equipment manufacturing sector. If this problem is not addressed in the short term, the lack of skilled labourers and computer technicians will be detrimental to growth in the long term.

The Cost of Capital

The majority of firms operating in this sector are small and with limited financial resources. Their size also contributes to their inability to attract the new capital necessary for acquiring appropriate technologies and expanding and modernizing plants. The reality of the FTA and the impending integration of the EC, and a NAFTA, means large investments for plants and equipment, R&D and market develop-

ment are required in order to exploit market opportunities. Canadian-owned firms in the sector are likely to have great difficulty obtaining the financing required for new investments, thus further complicating their efforts to become internationally competitive in an expanding global market.

The role of export financing must be examined. Export financing may be critical in determining if an export sale is made, particularly with respect to large projects or large pieces of equipment. Industry spokespersons are concerned that Canadian export financing is not as attractive as the competition's. Even where Canada does have world-class equipment, the sale of such equipment will be in jeopardy unless the export financing package is internationally competitive. Export financing must be competitive in order to maximize what the sector is striving to achieve in innovation, capital investment and enhanced labour skills.

Outlook for the 1990s

Prospects for the sector are favourable, despite the indifferent performance of the 1980s. This optimism stems from the fact that several industries are projected to experience significant growth during this decade. The AMT industry, which is currently estimated to have sales of \$1 billion (both software and hardware), is expected to enjoy substantial gains and should reach \$4 billion in sales by 1999. This growth will be from rapid market expansion in North America, Europe and Asia as firms seek to survive in fiercely competitive international markets by modernizing and automating the critical elements in product design and production.

Another projected growth area is ocean technology. Encouraged by the \$5.2-billion Hibernia offshore oil and gas development project, in addition to smaller developments such as Cohasset/Panuke, the ocean industry is developing consortia to exploit global market opportunities in marine robotics, ocean information systems and cold-ocean technology. The objective of these cooperative ventures in this innovative, highly export-oriented industry is to consolidate and further expand existing industrial capability that has leading-edge technologies.

The plastics-processing-machinery and plastics-moulds industry can be counted on to continue with their high-growth pattern. Entering the 1990s, this industry was estimated to have shipments totalling \$1 billion. This total is expected to double before the year 2000. More traditional sectors of the industry are expected to benefit from improved economic conditions and the resultant infusion of investment in the resource and general manufacturing sectors.

On the international front, the FTA (which will be implemented by 1993 insofar as this sector is concerned) and the impending NAFTA should afford long-term opportunities for firms within the sector, particularly for those firms that have rationalized their operations to the North American market. The resumption of the Multilateral Trade Negotiations (MTN) should ultimately result in better market access for Canadian products. The advent of *Europe 92* should pose no barriers to firms in the sector that have already established subsidiaries in the EC (Husky Injection Molding, Mold-Masters and Corma), or that have created joint ventures and strategic alliances with EC firms.

The 1990s will not be without challenges, such as the changing structure of the economy, increasing internationalization of markets and rapid technological change. Perhaps the most significant challenge is that Canada is shifting from a resource-based economy to a service-information economy, a change that will have a direct impact on sales in Canada of industrial machinery and equipment. Presently, 70 percent of the Canadian work force is employed in service-related industries, whereas in the late 1940s some 60 percent of the work force was employed in natural resources, manufacturing and construction.

A Sectoral Agenda for International Competitiveness

Research and Development

The single most important factor that will shape the sector during the coming decade is its ability to adapt new technologies, whether they relate to the ultimate product or to the processes (management and production) that support the manufacture of the product. All parts of the economy, but manufacturing in particular, must increase their awareness of productivity gains that can be achieved through the rapid imple-

mentation of appropriate information technologies, AMT, TQM (Total Quality Management), and JIT (Just-In-Time) manufacturing.

In addition, industry and government must act in concert with universities, research centres, suppliers and customers to create the requisite R&D and technology infrastructure for creating cutting-edge technologies with commercial applications.

Industry should take advantage of the existing R&D tax structure, and identify, acquire and commercialize requisite technologies through collaborative arrangements such as joint ventures and strategic alliances that bring state-of-the-art technologies to the sector.

Human Resource Development

It is imperative that educational programs be established in concert with federal and provincial governments, industry, and organized labour in order to ensure that the future labour force possesses the skills necessary to enhance the sector's global competitive position.

On their own account, industry and organized labour must work together to improve existing in-plant training programs, and institute appropriate new programs that ensure a better-educated, more-mobile and highly skilled labour force, one that is able to adapt to the ever-changing requirements of a technologically sophisticated domestic and international market.

Business Climate

In order to ensure the sector's viability, a positive business climate and culture must be created by promoting the following: entrepreneurship and risk-taking; improved management practices; business innovation; reduction of barriers to international competitiveness; and responses to the adjustment needs of sector firms, while ensuring that the response is consistent with strengthening the sector's long-term domestic and international competitiveness.

In addition, a long-term strategy for the sector must be created that will guide it through the 1990s, taking into consideration its strengths and weaknesses, and at the same time outlining the roles that industry, organized labour and government must assume in order to maximize the strategy.

An atmosphere of cooperation must be engendered between government and industry so that problems that affect the sector, such as environmental legislation, can be resolved.

Outward Looking

The planning and international marketing capabilities of the industry must be strengthened in order to position Canadian firms to take full advantage of the market opportunities that will be afforded them through the FTA, MTN, a NAFTA, and *Europe 1992*. Industries should make greater use of joint ventures and strategic alliances with Canadian and foreign firms in order to enhance competitiveness and to acquire world-class products, processes and marketing.

The Government of Canada should advocate policies and practices in financial markets that ensure the access to and availability of capital for small and medium-sized companies, particularly those that are knowledge-based and/or technology-driven. In addition, the federal government must ensure that existing export financing programs and practices are competitive with those being offered in the countries with which the sector competes internationally.

THE CANADIAN ELECTRICAL MANUFACTURING SECTOR IS A MAJOR CONTRIBUTOR to employment and wealth in this country. It is employment-intensive and provides high-quality, high-income work for about 85 000 people. It produces shipments annually of about \$9.4 billion, of which exports account for about \$1.8 billion. The industry is a prominent user of Canadian-processed raw materials, including iron, steel, copper, aluminum and plastic. As a high-tech industry, it provides an important market for other Canadian industrial sectors, producing a variety of component parts and semi-finished goods.

Structure

Canada's international competition in electrical manufacturing comes from the U.S., Europe and Japan. However, the U.S. is Canada's main source of import of electrical products (69 percent in 1990) and is in turn the destination of 78 percent of our exports. Electrical manufacturing in both countries underwent extensive restructuring in the 1980s, bringing major improvements in labour productivity. This restructuring widened a major difference between industries in the two countries: the Canadian industry has strength in custom-made and specialty products for special market niches, while the U.S. industry is more competitive in the standard, mass-produced product lines.

The Canadian electrical products industry is composed of manufacturers of two types of products: equipment that generates, transmits or distributes electricity (e.g. hydro and thermal generators, batteries, wire and cable, transformers, conduit, switches); and equipment that uses electricity to perform some other function (e.g. light bulbs, appliances, motors). The industry consists of many diverse subsectors. For practical purposes, these two classes of equipment have traditionally been assigned seven major subsectors: industrial electrical equipment; power generation equipment; wire and cable; major appliances; small appliances; miscellaneous electrical products; and batteries. All subsectors are affected by the newly emerging electrotechnologies (advanced batteries, amorphous transformers, superconductivity).

Although each subsector differs markedly from the others in technology employed, production techniques and markets served, the horizontal issues addressed below apply to all subsectors.

For purposes of industry analysis, it is more meaningful to subdivide the industry into the following categories: those firms producing limited numbers of customized pieces of equipment, and those producing high volumes of a standard product.

Conditions in these two groups are different. Product design is the key to success for specialty equipment, while price and volume competitiveness are more important for standard products. In the former, firms are using a strong domestic technology base to produce goods that are competitive in domestic and foreign markets. It is largely because of these firms that the industry has a thriving export business in electrical products. The firms manufacturing mass-produced goods are largely oriented to the domestic market. The small size of the Canadian market and some fragmentation of production have restricted the industry's ability to improve its competitive position through increasing scale and specialization. As a result, some of the products of these firms are vulnerable to competition from larger foreign producers who achieve lower production costs.

The industry consists of more than 700 establishments, and employs about 85 000 people. Production is highly concentrated, however, with the four largest firms accounting for 34 percent of sales. The industry is also regionally concentrated, with 90 percent of activity located in Ontario and Quebec.

Electrical utilities make up the largest single market for the industry. The residential and commercial construction and manufacturing resource industries make up its other principal markets.

The industrial electrical and power generation sectors form the core of the industry. Their products are high-technology, capital-intensive items such as hydroelectric generators, turbines, transformers,

circuit breakers and large motors. In all of these products, the industry has a strong domestic technology base and is internationally competitive.

The largest companies (Westinghouse Canada, General Electric Canada, Asea Brown Boveri Canada and Siemens Canada, all wholly owned subsidiaries) are small in comparison with their international competitors and affiliates. Only about 20 percent of Canadian firms employ more than 100 people. Large American, Japanese and European multinationals dominate the international markets for electrical products. Multinationals based in the U.S. and Europe own the largest firms in the Canadian industry, and produce most of its output. Canadian subsidiaries have access to their parent companies' leading-edge technologies. While some subsidiaries have international product and market mandates, others do not have access to certain export markets because of corporate policy.

As in most countries, the Canadian industry is oriented toward the domestic market. Electrical standards and other non-tariff barriers, as well as preferential purchasing practices by local utilities, tend to keep production facilities close to markets. Also, customer requirements for close, continuous applications engineering often give a competitive edge to local manufacturers.

Performance

Between 1983 and 1987, the value of shipments in the Canadian industry grew by almost 12 percent per annum. In the same period, U.S. shipments grew by about 14 percent per annum, indicating a small increase in the U.S. share of North American production.

While large increases in labour productivity have occurred in both countries as a result of continued rationalization and consolidation of the industry, the overall result in each country has been somewhat different. The U.S. has been moving toward more-automated mass production, reducing employment while increasing output by 14.3 percent per year. While the Canadian industry has also been automating, it has been moving more toward the production of specialty, high-value products for niche markets. The growth in value added by the Canadian industry was 9 percent per year, compared with 8.2 percent for

the U.S. Canadian employment grew by 1.7 percent per year, while U.S. employment decreased slightly by 0.1 percent per year; at the same time, labour productivity in value added per employee grew by 7.09 percent per year, while labour productivity in the U.S. grew at the slightly greater rate of 8.38 percent per year.

SECTOR PERFORMANCE — 1983 THROUGH 1987 PERCENTAGE GROWTH PER ANNUM (CONSTANT 1981 DOLLARS)

	Canadian Electrical Manufacturing	U.S. Electrical Manufacturing
Shipments	11.8	14.3
Employment	1.7	-0.1
Shipments (dollars per employee)	9.9	14.5
Growth in value added	9.0	8.2
Labour costs as percent of shipments	-8.3	-2.7
Material costs as percent of shipments	1.9	-0.8
Labour and materials costs as percent of shipments	-1.26	-1.38
Value added as percent of value of shipments	-2.59	-5.3
Labour Products (value added per employee)	7.09	8.38

Large improvements have also been occurring in labour costs. Between 1983 and 1987, wage costs in the Canadian industry, as a percentage of value of shipments measured in constant dollars, decreased by 8.3 percent per year, falling from 27 percent in 1983 to 19.1 percent in 1987. Wage costs in the U.S. electrical manufacturing industry have also been decreasing, but at a considerably lower rate than in Canada. In 1983, wages as a percentage of shipments in the U.S. were 21.1 percent, while in 1987 they were 18.9 percent — a decrease of 2.7 percent per year.

In the Canadian industry, material costs as a percentage of value of shipments increased by 1.9 percent per year between 1983 and 1987, going from 51.9 percent in 1983 to 56 percent in 1987. The relative material costs in the U.S. industry have been decreasing slightly, by 0.8 percent per year, from 47.6 percent of the value of shipments in 1983 to 46.1 percent in 1987.

Between 1983 and 1987, overall Canadian productivity increased as the costs of materials and labour, as a percentage of shipments, decreased from 79 percent to 75.1 percent. Production costs in the U.S. also decreased marginally, from 68.7 percent to 65.1 percent.¹

Strengths and Weaknesses

Throughout the 1960s and early 1970s, growth in world economies led to a strong demand for electricity and a resultant boom for equipment suppliers. The development of a local power-generation industry was given a high priority by provincial governments and resulted in the equipment market becoming fragmented, with a number of domestic suppliers living off high-margin government orders. The oil crisis in the mid 1970s, however, led to a substantial reduction in the growth of electrical demand, and power plant orders fell by 70 to 80 percent. Thus, the early 1980s were plagued by overcapacity, with too many manufacturers competing in a stagnant market. As a result of this and similar market forces operating worldwide, the Canadian industry restructured itself extensively, resulting in a significant shift to longer product lines and improved labour productivity. In Canada, restructuring was also accompanied by a major shift in the ownership of much of the Canadian industry to European multinational power-equipment manufacturers with world-competitive product and production technologies.

Strengths

Technological development has been the industry's most important competitive strength in the 1980s. Canada is the world's largest per-capita user of electricity, and the world's largest producer of hydroelectric power. The immense power requirements of our large resource industries, along with the challenge of equipping long-distance transmission systems in severe climatic conditions, resulted in the development of a world-class Canadian manufacturing industry. Because of Canada's unique requirements, important R&D has resulted in custom-engineered products that are world-competitive. These include

hydroelectric generators, large electric motors and extra-high-voltage utility equipment such as transformers, air-blast breakers and line reactors.

Canadian subsidiaries have access to state-of-the-art technology developed in large U.S. and European R&D facilities. The subsidiaries then further develop the imported technology to meet Canadian standards and operational conditions. The smaller, independent manufacturers develop their own technology, and also import product and process technology through licensing, joint ventures and strategic alliances.

In Canada, R&D activities concentrated in the provincial electrical utilities have been especially productive in developing competitive, state-of-the-art equipment. The utilities of Ontario, Quebec and British Columbia have large well-equipped R&D divisions with world-class testing facilities. Ontario Hydro and Hydro Québec, two of Canada's largest corporations, had the fifth- and seventh-largest company R&D expenditures in Canada in 1987. The industry works closely with provincial utilities in R&D for electrical products.

Research and development to improve Canada's nuclear capabilities also continues to be a major strength for the industry. Canada has an ideal source of additional electrical energy in uranium. Our domestic reserves are plentiful enough to provide a bridge into the 21st century, when other options will be available. We have one of the world's finest and most dependable nuclear generation technologies in the CANDU reactor, developed by Atomic Energy of Canada Ltd. (AECL). In 1989, nuclear power accounted for 12.3 percent of the electricity generated in Canada. AECL has sold units to South Korea, Argentina, Romania and India.

The emerging electrotechnologies (such as, fuel cells, superconductivity, and the Smart House) are universally accepted as having extraordinary potential for improving the world economy. In the 1980s, Canadian manufacturers, universities and electrical utilities continued to undertake R&D in a wide range of newer electrotechnologies. Although Canada is a world leader in many developing electrotechnologies, production is still limited to major product areas.

¹Source of statistics: Statistics Canada and U.S. Department of Commerce, Bureau of Census.

The industry's technology development has been encouraged by one of the world's most generous tax systems supporting R&D. Canada offers investment tax credits ranging from 20 to 30 percent, depending on location of the R&D and size of the corporation applying. The tax credit is provided on capital as well as current qualifying R&D costs. In a study published in May 1990, The Conference Board of Canada judges Canada to have the most generous tax treatment of R&D among 10 prominent countries in the world, including the U.S. and Japan.

Product quality is also a major source of competitive strength and has been a key to success against Japanese and European competitors in Third-World power-sector markets. Products in the Canadian manufacturing industry meet the stringent requirements of the Canadian Standards Association, whose norms are as least as rigorous as those of the U.S. Canadian electrical manufacturing must also meet the quality standards required to cope with Canada's severe climatic conditions, as well as the extreme operating conditions in Canada's large resource industries.

Excellent management-labour relations are also a major strength of the industry; there has not been a significant strike or work stoppage throughout the 1980s. With this impressive record, the industry is adapting to meet the new challenge of the 1990s. Discussions with and among employees are being cultivated in areas such as elimination of non-essential work, management practices, and policies and procedures. As one CEO recently put it:

By openly attacking the business processes and by trusting our work force, we are empowering people and creating self-confidence that carries through outside the workplace. We are beginning to find that our employees are happier, more productive and more involved outside of work. They are more self-confident. Empowerment for employees has become one of the main cornerstones for the future success of our company. Managers no longer control and meddle; they lead and coach. We are putting responsibility where it belongs — with the people closest to the work.²

Canadian management is experienced, and is marketing and bottom-line oriented. Also, the increasing globalization of the industry has encouraged management to adjust accordingly. With the increases in trade and world competitiveness, there is an increasing need for CEOs to have a global outlook.

Weaknesses

Managers of Canadian subsidiaries are in continuous, vigorous competition with sister companies around the globe to attract new investment, and reinforce Canada's international image as a positive, peaceful, stable and united country. The competition for world capital is becoming more difficult, especially with the present recession.

To a large extent, preferential procurement practices of provincially owned utilities have resulted in the multi-plant structure of the industry. This has provided local manufacturers with an assured domestic market, and a product mix to withstand cyclical fluctuations in demand, but it has also led to higher costs and diminished international competitiveness for many products.

Differing electrical standards remain a large barrier to international trade, almost always raising production costs for exports and, in some instances, barring entry completely.

The industry views high government deficits, with their negative effects on interest rates and export financing, as detrimental to competitiveness.

In export marketing, the industry benefits from financing provided by the Export Development Corporation (EDC) and from international sources such as the World Bank and the Asia Development Bank. The availability of this financing encourages not only individual exporters but also national and international consortia when pursuing large projects. Unfortunately, Canadian competitiveness is considerably weakened when many foreign countries support their exporters by using grants and aid tied to export credits. This provides distinct advantages to their suppliers in the bidding process for internationally tendered projects.

² Dennis K. Williams, Chairman and CEO, General Electric Canada Inc., in a speech to the Canadian Club, Royal York Hotel, Toronto, April 15, 1991.

Dumping can have a major effect on the domestic market, as evidenced by several successful actions in recent years, notably for insulators and electric motors. Dumping is often difficult to prove. The time, cost and effort involved in pursuing anti-dumping actions discourage many domestic firms from proceeding. In Canada, *injury* to the industry must be proved. In other countries, particularly in the U.S., the definition of injury is such that imports into these countries are deemed to cause injury at a lower level of penetration than in Canada.

Many Canadian firms in the industry have *small-company flexibility*. The small size of many Canadian firms enables them to respond quickly to changing market requirements, and to provide specially designed products to meet individual customer needs. On the other hand, many smaller firms in the industry have no experience in exporting. In addition, even the largest Canadian firm acting alone is usually too small to undertake a large utility project. Canadian electrical utilities have developed their own turnkey project capability and rely on the manufacturing industry for equipment only. The industry's lack of project experience is a major handicap when bidding on projects in developing countries that normally require a complete turnkey package. The industry is responding to this challenge by forming export consortia, and through joint ventures with large foreign firms, particularly Japanese firms, to help access the Asian market.

The industry suffers from a significant shortage of experienced tradespeople, technical workers and specialist electrical technologists and engineers. Skill shortages are common in the Canadian and U.S. electrical industries, and are a major factor in reducing the competitiveness of the North American electrical industry. With assistance from Employment and Immigration Canada, the Electrical and Electronic Manufacturers Association of Canada has been studying the problem with the five major unions of the industry: the International Brotherhood of Electrical Workers, the United Electrical Workers, the Communication Workers of Canada, the Canadian Auto Workers, and the United Steel Workers of America.

The joint studies and analysis began in 1984, and the Electrical and Electronic Manufacturers Association of Canada recently undertook an agreement with EIC and the unions to set up a Sectoral Skills Council. The council's primary purpose is to set up a fund for the skills training needed by the industry. The fund will increase the retraining and skills development opportunities for workers in the industry. It is the first fund of its kind in Canada for a specific industry.

Outlook for the 1990s

The industry must adjust to changing needs. Over the long term, growth and competitiveness will depend to a large extent on the increasing emphasis on the environment. In the field of electrical generation, there will be a shift away from large-scale hydro and thermal generation plants to smaller combined-cycle power stations based on gas turbine generators. These smaller power stations are easier to install, more efficient, cheaper to run, and less polluting. There will also be a greater demand for more energy-efficient electrical products and processes. Another area of particular interest is the automobile, where the requirements for reduced vehicle emissions will offer new opportunities for electric vehicles and their associated electrical power supplies and motors.

With pressures to achieve greater economies of scale, the industry will likely continue to restructure itself in the 1990s to further improve productivity and competitiveness. With continued rationalization in North America on a north-south basis, production should continue to increase without comparable increases in employment, which should improve profit margins for reinvestment in plant equipment.

Trade with the U.S., the industry's largest single export market, will continue to increase. The U.S. utility industry, however, tends to support local manufacturers. The main formalized non-tariff provisions are federal Buy America provisions, which accord preferences of up to 30 percent for federally funded projects. These, and similar purchasing preferences legislated in some states, often present a large barrier to exports to the U.S. The FTA is improving access

to the U.S. market by reducing protectionist attitudes of U.S. buyers. It is also improving access by phasing out tariffs between Canada and the U.S. With rationalization and increased manufacturing efficiencies, the industry is adapting itself to the FTA to become more competitive in the U.S.

The largest potential markets for the industry are in the burgeoning power sectors of the developing countries, particularly China, India, Pakistan and Southeast Asia; the industry is pursuing these markets. Trade with Mexico and Europe is small, but will increase steadily with the advent of *Europe '92* and a NAFTA.

Removal of the Manufacturers' Sales Tax (MST) and its replacement with the Goods and Services Tax (GST) will increase the industry's competitiveness. Exports will be more competitive with the institution of the GST, while imports, which are about 30 percent of the market, will be less competitive against Canadian manufacturers. With imports now competitively taxed, the GST will tend to increase Canadian product content and Canadian employment in the electrical subsectors that import parts for assembly in Canada.

There will be increasing pressure on companies to adopt new technologies and upgrade the skills of employees to operate these technologies. There will be a continuing need for training programs to ensure the vitality and viability of the industry when facing international competition. Although government programs and educational institutions continue to play their role, in many ways the technological environment is changing too quickly for them to meet industry's needs. There will be an increasing need for companies themselves, in cooperation with labour, to provide training and new skills development.

A Sectoral Agenda for International Competitiveness

Human Resource Development

The Sectoral Skills Council, which comprises representatives from management, the unions, education institutions and government, has set up a fund to increase the retraining and skills development opportunities for workers in the industry. To build on this initiative, it is necessary to ensure that the education system provides the necessary support for programs

that emphasize technical education, both for new graduates and for ongoing upgrading of the work force. As well, industry, particularly multinational companies, could improve employees' awareness of the need for continual upgrading of skills by encouraging them to take interchange assignments in overseas facilities where they would be exposed to the competition.

Innovation and Technological Development

The electrical industry has been successful in developing and implementing new technologies. This has resulted from the subsidiaries of multinationals using the R&D of their parents and adapting new technologies to Canadian requirements. Canadian companies have also been active in adapting new technologies through licenses, technology transfer and joint ventures.

Nevertheless, there are further opportunities for the industry to benefit from the considerable R&D carried out by the major Canadian utilities in their world-class laboratories, by the National Research Council and by universities.

A critical issue is the supply of suitably trained technicians, technologists and engineers. There is a need to encourage a wider acceptance of Canadian programs that are similar to those that are much admired in Germany and the U.K. (the technical programs that parallel the more traditional university courses, and that are accepted as equal to a university education).

More emphasis could be placed on international collaboration on new electrotechnologies similar to the program being proposed for IMS (Intelligent Manufacturing Systems) by Japan, the U.S., Europe, Canada and Australia.

Trade

The electrical manufacturing industry is internationally competitive in the quality and price of its custom equipment. The industry has recognized the need to act together in securing large international projects, and in the area of electric power systems, companies have joined together under CAPSEP (Canadian Power Systems Export Promotion) to bid on such projects. CAPSEP also includes consultants, utilities and constructors, in addition to the electrical equipment manufacturers.

The majority of electric power projects open to Canadian industry are in developing countries that normally seek financing at concessional rates. Canada has restricted funds available for such financing and is opposed to the provision of soft credits. Canada is pressing members of OECD to withdraw from the practice. In the meantime, however, Canadian industry must be more creative in identifying alternative financing solutions. In particular, the industry should be accessing more international financing from merchant banking, Canadian and multinational financing institutions, and other sources such as Japanese untied aid funds.

In the case of the small to medium-sized companies, there is limited export experience. To increase their focus, these companies should make more use of the existing government intelligence network and export

programs for markets in Asia and the U.S. Of particular interest to these companies would be government support to attend trade fairs in selected export areas.

There is a need for more world-market mandates for Canadian companies owned by large multinationals. There is also a need for joint industry-government cooperation on dealing with such issues as anti-dumping, harmonization of electrical standards internationally, and restrictions to trade such as Buy America.

The industry must continue to make the federal and provincial governments aware of problems associated with dumping, interprovincial trade barriers, foreign ownership restrictions, competition policy, and intellectual-property rights, and to work with government to resolve these problems.

THE INFORMATION TECHNOLOGY SECTOR INCLUDES COMPANIES THAT DESIGN AND manufacture telecommunications and microelectronics equipment, computers and software, and that provide computer and telecommunications services. The sector has strategic significance, not merely as a leading industrial sector, but also because of the increasingly broad application of its products and services across all types of business activity.

Structure

About three quarters of the information technology sector is situated in Ontario and Quebec, with pockets of excellence distributed across the country, notably in British Columbia, Alberta and Nova Scotia. The sector employs over 67 000 people in manufacturing and a further 60 000 in software product development and computer services.

In 1990, the information technology sector in Canada shipped nearly \$10-billion worth of manufactured goods. In 1988, software and computer service revenues were valued at more than \$4.6 billion. The total domestic market for information technology — including computer and telecommunications equipment, software, and computer and telecommunications services — was over \$31 billion in 1988.

Telecommunications and Microelectronics Equipment Industry

Telecommunications and microelectronics equipment form the largest industry segment within the Canadian information technology sector. The industry manufactures telephones, switching equipment, transmission equipment, satellite systems, integrated circuits and electronic components. The largest company in this industry is Northern Telecom Ltd. Approximately 200 additional small to medium-sized firms, mostly Canadian-owned, make up the rest of the industry.

The industry is global in its outlook, and manufactures for the world market. In addition to Northern Telecom, which has manufacturing locations throughout the world, a few of the larger telecommunications firms, such as Mitel and Newbridge, have established beachheads outside Canada to gain access to foreign markets, technology and low-cost labour. At present, key markets for telecommunications and microelectronics equipment companies are the U.S., Europe and the Far East.

Canada's vast size and harsh climate have created a unique demand for long-distance telecommunications technology and services. This has fostered the growth of the telecommunications equipment supplier industry. The telecommunications utilities in Canada, for example, have an installed asset base valued in excess of \$35 billion. Canada has always been a leader in the application of advanced telecommunications technology. For example, Canada has led the world in the application of satellite communications to serve the domestic market. The domestic telecommunications market, though highly developed, is protected by a policy-regulated framework and sheltered behind tariff walls from all but U.S. companies.

The telecommunications and microelectronics equipment industry produced goods worth just over \$7 billion in 1990, of which almost three quarters were exported, primarily to the U.S. In telecommunications equipment, the industry posted a small trade surplus in 1990 after two consecutive years of trade deficit. For several years before that, the industry had performed with a trade surplus. It employed 48 000 in manufacturing and spent in excess of \$1 billion in 1990 on R&D, to make leading-edge products for the domestic and world markets.

Computers

The computer industry is dominated by subsidiaries of multinational enterprises such as IBM Canada, Digital Equipment of Canada, and Hewlett-Packard Canada. Among Canadian-owned firms, there are about 30 manufacturers of special-market computers and peripherals including Cemtech Ltd., Circo Craft, Matrox Electronic Systems, Mind Computer, and Ogivar Technologies.

Ten of the largest multinational enterprises manufacture in Canada on a product mandate basis; that is, the Canadian firm produces a product line under contract to supply its parent. Subsidiaries spend, on average, less than 3 percent of their revenues on R&D,

obtaining much of the product and process technology they need from their parents.

In 1990, the Canadian computer industry employed nearly 19 000 people in manufacturing, and shipped close to \$3 billion worth of goods, 80 percent of them to the U.S. (the world's largest market for computer products).

Canada currently imports almost all of its computer requirements. This has yielded the information technology sector's largest sustained trade deficit — \$3 billion annually — and this is growing. Imported goods include mainframes, minicomputers, microcomputers, peripherals (printers, monitors and cards) and copiers.

Software and Computer Services

The software and computer services industry in Canada has over 9 000 establishments (including many two or three-person organizations). The industry is characterized by low entry costs, and benefits from close links with a strong university infrastructure. Software and computer services in Ontario and Quebec accounted for 80 percent of 1988 revenues.

In 1990, approximately 57 firms had revenues greater than \$10 million. Among them were internationally recognized software and systems integration firms such as Cognos, Corel, Systemhouse and DMR. Computer companies, such as IBM, have also found Canada an attractive location in which to develop software and have established software development facilities near Toronto and Montreal. The software and computer services industry invested over \$230 million on research and product development in 1990, while employing approximately 60 000 Canadians. Industry revenues for 1988 neared \$5 billion, of which 14 percent were on software product development. The remainder of the revenues were derived primarily from computer services and systems integration.

While most of the service and systems integration firms have a domestic focus, many of the software producers do export, primarily to the U.S. Almost one third of all exports resulted from custom products originating at the IBM Canada Laboratory in Toronto. The software and computer services industry is running an apparent trade deficit in excess of \$300 million, largely in popular applications programs for micro and mainframe computers.

Performance

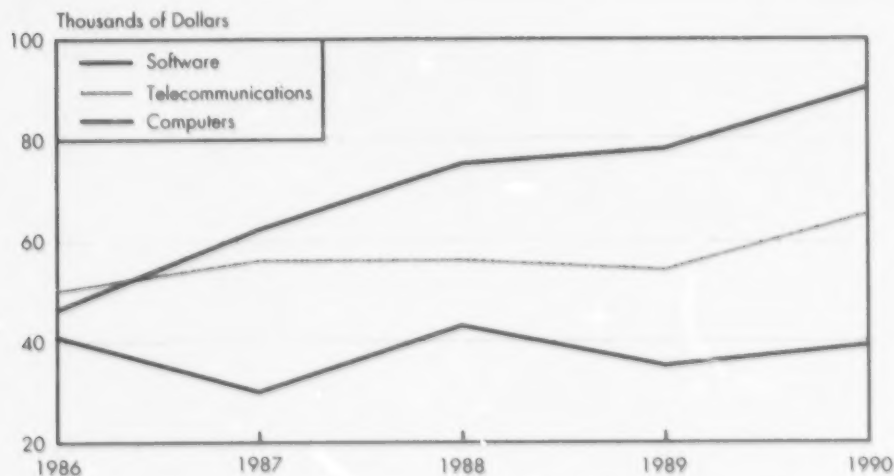
During the 1980s, the information technology sector emerged as one of the pre-eminent industrial sectors in the world. For the first time in the U.S., more people were employed by electronics manufacturers than by the automobile industry. As American multinationals began to rely on the development of world markets for their products, they looked abroad for new sources of supply for inputs and for product manufacturing sites. Now manufacturing in numerous locations around the globe, the more successful multinational enterprises rely on foreign markets for about one half of their corporate revenues.

The first real challenge to American leadership in this critical sector also came in the last decade. Japan and its rapidly developing Asian neighbours have become the hub for a significant portion of this sector's manufacturing base. Japan surpassed the U.S., first in consumer electronics and then in semiconductors and, as the decade drew to a close, began to challenge North American and European companies in the areas of computers and telecommunications equipment.

During the 1980s, Europe embarked on a series of ambitious research projects. The governments of France, Germany, Britain, Italy and others, along with Europe's leading multinationals, committed billions of dollars to enable Europe to become self-sufficient in information technology. Major government-funded projects were launched in the last decade to focus R&D resources, in both the private and public sectors, toward attaining this goal.

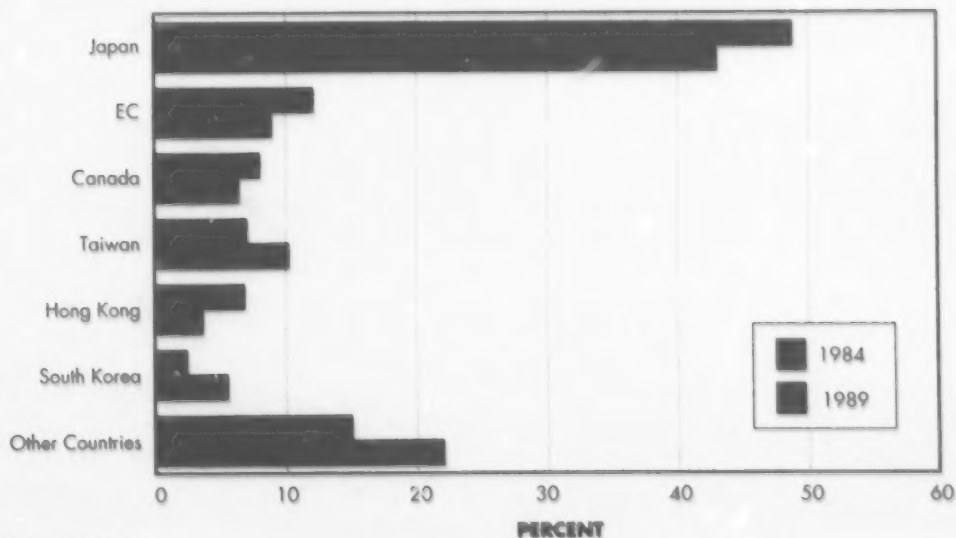
The 1980s also introduced a transition for Canada's information technology sector. Shedding its branch-plant style of operation, the computer industry concentrated on developing specialized product lines for regional and world markets. In telecommunications equipment, Northern Telecom became a global organization with a significant manufacturing and R&D presence in the U.S., as well as operations in Europe and Asia. In software and computer services, Canadian firms such as Cognos, Systemhouse and DMR gained international respect for their products and technological capabilities in providing software and computer services.

CHART 1
REAL GDP PER EMPLOYEE



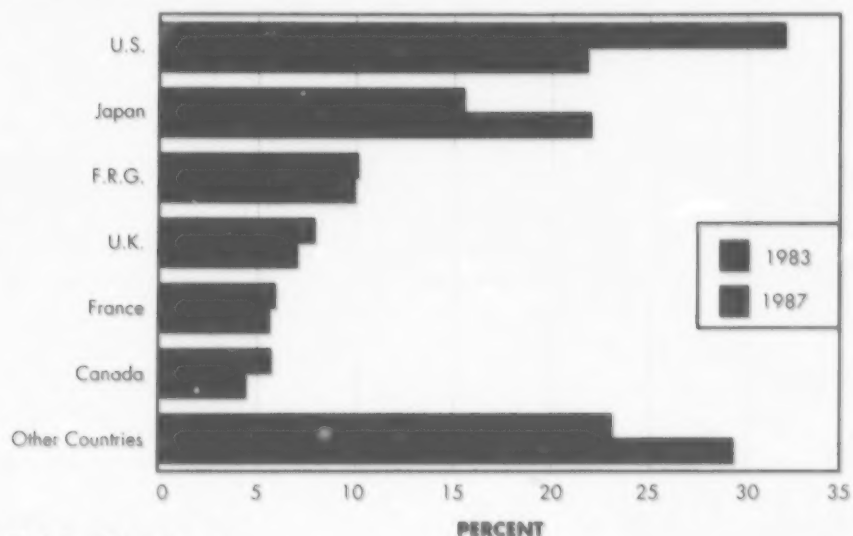
Source: ISTC.

CHART 2
SHARES OF U.S. IMPORTS - COMPUTERS, 1984 vs. 1989



Source: ISTC.

CHART 3
COUNTRY SHARES OF WORLD EXPORTS — COMPUTERS*
1983 vs. 1987



*Excluding office equipment

Source: ISTC

Recent trends indicate large gains in output per employee for both the computer and the telecommunications equipment industries, the result of significant investments in manufacturing, automation and R&D (Chart 1). In contrast, trends for the software and computer-services industry have remained stable, largely because the industry is labour-intensive and will not show dramatic productivity increases until a higher degree of automation, such as Computer Aided Software Engineering tools, is reached.

While gains in productivity are noteworthy, Canada's declining share of world export markets and of the U.S. import markets for these goods is more significant (Charts 2 and 3). Within the telecommunications equipment area, Canada has maintained its 4 percent import share of the important U.S. market. While U.S. imports of computer goods doubled between 1984 and 1989, Canada's share of this market declined from 8 to 6 percent. In the North American marketplace, both Canadian and American firms continue to face stiff competition from Japan and the Far East.

Strengths and Weaknesses

Availability and Access to Capital

One of the most persistent issues over the past decade has been the cost and availability of capital. North American information-technology firms must seek their venture and mezzanine financing in the open market, placing them at a competitive disadvantage with Japanese and other Far Eastern firms, which have access to low-cost capital from within their highly integrated corporate families, or *Keiretsu*. Access to low-cost capital has enabled the Japanese and Koreans to invest heavily in capital-intensive industries, particularly in semiconductors, computers, telecommunications equipment and consumer electronics, with a long-term goal of increasing world market share.

Access to funds continues to be a problem for small and medium-sized enterprises (SMEs) in Canada's information technology industry — as the investment capital that was available in the early 1980s has lately been applied to more familiar and

profitable markets (such as real estate). Investors of venture and mezzanine capital that still support information technology SMEs are less *patient* and demand a higher rate of return to compensate for perceived higher levels of risk. The survival of SMEs in the information technology sector depends on their ability to secure the funds necessary to drive the next generation of product R&D, a challenge made greater by high capital-costs and a new product cycle every 18 months.

Large multinational enterprises and their subsidiaries have had access to capital from sources around the world, and consequently, this issue has had minimal impact on the Canadian computer industry. However, the lack of domestic sources of knowledgeable and *patient* capital in the telecommunications and microelectronics, and software and computer services industries has delayed expansion plans, displaced investment to other markets or resulted in the sale of firms to larger foreign-based enterprises.

Human Resource Development

One of Canada's outstanding competitive advantages has been a highly skilled and motivated labour force. During the last decade, Canada emerged as one of the best and most profitable locations for R&D establishments in the world. The major contributing factor is that Canada's world-class educational systems consistently produce high-quality engineers that are globally competitive in terms of both cost and ability. Key areas of strength include software engineering and design, computer sciences, microelectronics design, and telecommunications. However, Canada has consistently produced fewer engineers as a proportion of all graduates than the U.S., Japan or Europe.

One of the information technology sector's greatest challenges is to continue to develop a secure supply of highly skilled labour to meet future demand. Gaps are appearing across the board — in technical, management, marketing and production personnel. The ebb of the Baby Boom generation, a low participation rate by women in science and engineering disciplines, a steady decrease in skilled immigrants, and cultural and remunerative biases favouring business administration, medicine, and law over engineering and tech-

nical fields, all contribute to a growing human resource crisis in information technology. The number of new engineering and applied sciences enrolments has steadily declined since 1983.

Training programs are required to rapidly train or retrain technicians, and to give graduates a greater and more applied knowledge base, assisting them to integrate more quickly into the workplace.

Corporate Strategies and Management

Information technology firms in Japan, Europe, the U.S. and Canada have been implementing quality, globalization and organizational programs that enable them to compete internationally. A dynamic corporate strategy will continue to be a key to competitiveness in the 1990s.

Corporate strategies for computer multinational enterprises in Canada have always been directed by the parent, whether in manufacturing or marketing and distribution. In order to fulfil global corporate strategies initiated by parent organizations, this industry has rapidly modernized its production, adopted quality management techniques and developed global perspectives.

The telecommunications equipment industry has undergone strategic shifts in management and production orientation in order to survive in a rapidly changing global environment. Firms have had to globalize to conform with restrictions in major markets. Quality is of paramount importance, and significant progress in this area has been made by many firms. Northern Telecom, for instance, is one of only two non-Japanese firms to have won the prestigious Deming Prize awarded by MITI in Japan to firms meeting stringent quality standards. Excellent technology management continues to be a hallmark of this industry, with Canadian firms among the world leaders in their areas of expertise. However, this sector is characterized by a strong niche orientation and an emphasis on marketing to governments, utilities and large institutions, leaving a weakness in general marketing and business management skills and strategies.

With its emphasis on design and small-scale, high-quality production, the microelectronics industry is also at the forefront of globalization. Within their niches, Canadian microelectronics firms are among the best in the world. But lacking the capital investment to sustain a global capability in production, many of these firms have had to exploit their international connections to ally themselves with foreign partners, thereby exchanging production for intellectual property.

While technically strong, the software and computer services industry suffers from weak management and marketing skills. Many of these firms are small and under-capitalized, and the key individuals driving the technological development often have limited financial or marketing expertise.

Government

It is understood by governments around the world that the information technology sector is of critical significance to the competitiveness of their respective economies. All major industrialized nations and many developing ones now have strong national R&D programs and initiatives to attract investment from information-technology multinational enterprises.

Governments have become heavily involved in this sector because developing future generations of technology involves high risk and demands significant capital investment. A competitive advantage in developing leading-edge information technology has become a matter of national pride and technological security to many nations.

Megaprojects, strategic initiatives, government procurement and infrastructure development have all become popular mechanisms for governments to participate at the national level. At the state and local level, particularly in the U.S., incentives to attract foreign and even domestic investment to specific locations are commonplace.

During the 1980s, the U.S. initiated SEMATECH, MCC (Microelectronics and Computer Technology Corporation), the Strategic Defense Initiative, and other advanced information-technology projects funded by the U.S. military, mainly through the Defense Advanced Research Projects Agency

(DARPA). Europe launched JESSI, ESPRIT, RACE and other innovative government-industry programs. The Japanese responded with the Fifth Generation Project, a high definition television (HDTV) initiative, and cooperative ventures involving telecommunications and microelectronics.

Canada has long had one of the world's most generous R&D tax environments. It has stimulated investment by the private sector, and made this country one of the most competitive locations for R&D activities. Initiatives such as IRAP, the Microelectronics and Systems Development Program, Networks of Centres of Excellence, and the Strategic Technologies Program have formed the bulk of the Canadian government's investment in information technology. The total investment over the last decade was about \$500 million. In addition, Canada's Rationalization Policy offers procurement benefits to computer multinational enterprises in exchange for their investments in production, R&D, supplier development and related activities in Canada. At the provincial and municipal levels, with the exception of Quebec, procurement is not widely used for industrial development.

While Canadian programs have been, for the most part, open to companies from abroad, the same cannot be said for the programs of other countries. A notable exception has been the opening up in the U.S. of MCC and SRC (Semiconductor Research Corporation) to Canadian firms, largely in response to the FTA.

Technology Access and Diffusion

Technology was the main competitive weapon throughout the 1980s, as firms battled one another to break or extend the barriers of speed and size. Its development and diffusion has resulted in new products and markets, and has changed the way we live and work.

The U.S. retained its overall lead as the wellspring of innovation, creating the personal computer, the workstation, the supercomputer, the advanced microprocessor and new software applications. The Japanese demonstrated great innovative ability in taking technology, refining and improving it, all the

while reducing costs and improving quality and functionality. As a result, Japanese companies are now the world leaders in semiconductors and related electronics products. The Europeans have provided the world with advances in both consumer electronics and telecommunications technologies.

Canada has played a role in providing technology leadership in the area of telecommunications and microelectronics. This is the result of significant investment and focus on the telecommunications sector via Northern Telecom. Northern Telecom and its subsidiary, Bell Northern Research, spend almost \$750 million each year on R&D in Canada — three quarters of all the R&D funded in the information technology sector. Most of the technology is developed in-house, though in the future an increasing amount will be acquired through strategic alliances, or participation in domestic and foreign-based R&D consortia. For example, Northern Telecom has joined the U.S. research consortium MCC.

In the computer industry, subsidiaries of the multinational enterprises access technologies primarily through the parent organization. Royalties are paid to transfer technology used to support the Canadian subsidiaries product mandate. R&D performed by the computer industry is usually performed under contract to the parent company and is not used in a finished product manufactured in Canada.

The software and computer services industry spends a great deal on R&D, regularly contributing 12 percent of revenues to new product development. As in the telecommunications and microelectronics equipment industries, there is considerable scope for these firms to gain access to technology via participation in strategic alliances and R&D consortia.

It is noteworthy that, as a result of the FTA, U.S. consortia and research institutes are willing to consider partnership with Canadian organizations. Although not specifically included in the agreement, in the spirit of the FTA, these groups are prepared to grant the same opportunities to Canadian organizations that were once available exclusively to U.S.-based organizations.

Market Access

As the information-technology sector globalizes, access to key markets becomes an important challenge. Many European markets are protected by various tariff and non-tariff barriers and Japan has long been considered to have an impenetrable market. The U.S., one of the most free markets in the world, is still biased in favour of domestically manufactured products and has legislated support for American small businesses.

As a leading trading nation, Canada has been at the forefront of trade liberalization, lending its full support to the GATT process, the FTA and now North American free trade. Consequently, our domestic market is one of the most open in the world.

The major exception is Canada's regulated domestic telecommunications industry. In attempting to maintain a consistent, high-quality level of service across the country, Canada has sanctioned monopolies by Bell Canada and the provincial telephone companies that limit new entrants and competition. It has been argued that, in accomplishing this national objective, there have been fewer opportunities for Canadian equipment manufacturers and service providers to participate in the domestic market. On the other hand, vertical integration between Bell and Northern Telecom has fostered the development of the one large Canadian MNE that can compete on a global scale. A recent court decision granting jurisdiction for telecommunications to the federal government may result in greater national regulatory consistency. Further deregulation may offer greater opportunity for Canada's telecommunications equipment manufacturers to compete within the domestic market.

The telecommunications equipment industry faces unique market access challenges abroad. Because telecommunications is still largely protected in most markets, firms frequently must establish manufacturing facilities in key markets in order to be able to sell their goods. This is true of Europe, Japan and even, to some extent, the U.S. Standards, product registration and approval are significant non-tariff barriers, and have been used to keep Canadian technology out of

the German, French and Japanese markets in particular. These barriers have been addressed by making direct investment commitments in the market, licensing technology to domestic manufacturers, or by selling Canadian-made equipment to the domestic company for resale under their label.

Access to markets has typically not been a problem for the computer industry, where over 90 percent of all trade is intra-corporate. The finished products are shipped to the parent company, which distributes them to markets around the world using its considerable marketing capabilities and distribution networks.

For the software and computer services industry, the primary market is the U.S., which is open and accessible. Subsidiaries of multinational enterprises distribute products through their parent companies and SMEs generally sell via distributors or through distribution agreements with hardware vendors.

Outlook for the 1990s

Looking toward the next decade and the beginning of a new century, the Canadian information technology sector will continue to maintain a prominent role in the telecommunications equipment industry, develop unique capabilities in microelectronics, exploit niches within the software and computer services industry, and continue to build on Canadian capabilities in emerging technologies such as photonics and artificial intelligence. As a world leader in systems integration, the globalization of the high-value-added service industry offers an outstanding opportunity for Canada. As trade liberalizes and markets open up around the world, Canadian information-technology manufacturers and service providers are well positioned, within high-value-added niche markets, to offer competitive and technologically innovative solutions.

Of even greater importance to Canada is the ability to marshal the strengths of the industry to address the vast opportunities to develop information technology for application to the other key sectors of the Canadian economy. The competitiveness of sectors such as manufacturing, mining, forestry and fishing/agricultural products, as well as the service sector, will be determined by the creative use of information technology in all aspects of the enterprise.

Canadian information-technology firms will face increasing competition from abroad in the Canadian markets for hardware and services.

While Canada has long been an excellent location in which to perform R&D, the challenge facing Canadian firms in the 1990s will be to develop products and services from this research that can be applied in markets both in Canada and around the world.

A Sectoral Agenda for International Competitiveness

Availability and Access to Capital

To compete against low-cost capital available to foreign competition, firms will have to become more innovative in accessing sources of funds. Firms will have to seek partnerships with large multinational enterprises that use or develop technology and can offer not only patient capital, but technology and market expertise.

Canadian firms will also have to become more efficient in their use of capital — making more innovative use of design tools, reducing time to market, sharing or buying rather than making technology, and implementing quality-control programs. Marketing strategies that identify user or consumer demands and exploit these by quickly bringing high-quality, competitively priced products to market will be key to future success. More effective management also will improve profitability and attractiveness to the investment community.

Governments can help increase investment in this sector by raising the level of awareness in the investment community of information technology and its successes, and facilitating transfer of technology out of government laboratories. It can also help by making more effective use of existing government programs in funding pre-competitive R&D and consortia to promote synergies among firms within the sector.

An example of government-industry cooperation occurred about three years ago in the area of taxation. ISTC, Revenue Canada and information-technology industry associations worked to clarify the interpretation of tax regulations as they applied to R&D conducted in the software industry. Together, they were able to explain the issue, clarify the interpretation

of the tax regulations and inform the information-technology and financial industries that software R&D firms were, indeed, eligible for tax credits. Moreover, the processing of these credits was streamlined to provide a faster response — something that is very important in an industry where time is of the essence. This resulted in an improved environment for obtaining financing for R&D in the software industry. There is some evidence that there is more to be done in this area.

Human Resource Development

S&T firms in general, and information technology firms in particular, can provide exciting career opportunities. Industry must join with governments and community leaders to promote these opportunities to elementary and high-school students (especially girls). Industry needs to take a much greater role in assisting schools to acquire appropriate technology, develop more relevant curricula and develop exchanges and work teams that will promote closer linkages between industry and academia.

Industry must play a greater role in devising re-training and apprenticeship programs in universities and technical colleges. To avoid losing Canada's best thinkers to the U.S., industry must actively recruit, making opportunities available to the best students in Canada.

There may be some scope to facilitate the immigration of skilled people into Canada to fill gaps in critical areas. However, the major thrust in dealing with the human resource shortage must be improving education and training.

Given the urgent need to develop and maintain Canada's human resource base, how can Industry take a leadership role in response to this challenge?

Corporate Strategies and Management

The challenges facing management in information-technology manufacturing companies are the same as those of other manufacturers. To address the competitiveness challenges of the 1990s, technology-based firms must become more responsive to the market and the needs of their customers. They must continue to implement Total Quality Management programs to virtually eliminate product defects, to lower production costs and to build an international

image as a quality supplier. Management approaches such as Just-In-Time manufacturing and continuous improvement also must be used to reduce costs and improve efficiency. Companies must continue to globalize their operations to take advantage of competitive sources of supply, technology and capital around the world. Because many of the tools to achieve these objectives involve information-technology applications, companies in this sector need to be at the forefront in applying these technologies as well as promoting them to others. AMTAP is an example of an initiative where government and industry work together to achieve these objectives.

Foreign-owned multinational enterprises should integrate the full range of R&D, manufacturing and marketing functions within their Canadian operations and within the Canadian information-technology sector in general.

What can be done to establish a manufacturing culture within Canada and to hasten the adoption of quality manufacturing and management strategies by the private and public sectors?

Technology Access and Diffusion

In order to strengthen technology access and diffusion, firms should participate in partnerships involving other firms, the public sector and academia, in Canada and abroad.

Industry should challenge government and academic laboratories and research institutes to become more market oriented and of greater service to business in developing and transferring technology to the private sector. Governments, in turn, should facilitate the transfer of technology from the labs to industry and attempt to orient R&D programs to areas that could best enhance the competitiveness of Canadian firms, especially over the long term.

The federal government should continue to try to ensure access for Canadian firms to foreign consortia and research programs in order to provide Canadian companies the same opportunities that foreign firms enjoy in Canada.

Given that the competition in technology transfer is aggressive, what can be done to make sure that resources (people and money) are made available to exploit technologies developed in Canada and abroad?

Market Access

To build on successes, such as the FTA (and a possible NAFTA) and to promote trade liberalization, government and industry must cooperate to push for the speedy removal of non-tariff barriers. This is particularly urgent in Europe and Japan in the area of telecommunications. Firms can identify specific non-tariff barriers that prevent Canadian-made goods or services from entering foreign markets, and the federal government can raise these issues in the appropriate fora.

The federal government could also support efforts to include services within the GATT framework to provide increased opportunities to promote the internationalization of services where Canadian firms are strong performers.

What steps can industry take to ensure that governments in Canada, and around the world, move rapidly toward fair international trade?

THE CANADIAN AEROSPACE AND DEFENCE ELECTRONICS SECTOR IS TECHNOLOGY-intensive and has specialized capabilities in the research, development, manufacture, worldwide marketing and support of complete aircraft, propulsion and related systems, as well as components, space equipment, aircraft navigation systems and defence electronics. The Canadian sector is niche-market oriented and heavily reliant on access to export markets. Shipments in 1990 totalled \$8.2 billion, with more than 70 percent of the sector's output destined for civilian aerospace applications.

Structure

The sector's markets are truly international: customers include aircraft manufacturers, aircraft operators, major civil aerospace and defence contractors, military end-users and governments. These customers set stringent manufacturing process and product performance specifications. To satisfy these exacting requirements within significant constraints (on product weight and size, noise generated, etc.), aerospace and defence electronics firms must make significant R&D investments to stay at the forefront of analytical techniques and new materials technologies.

There are approximately 300 firms in the sector, directly employing approximately 64 000 people. The 20 largest firms account for 80 percent of total Canadian output. Ninety percent of the sector is located in Ontario and Quebec, particularly near Montreal and Toronto. The industry is also important in various regional centres, including Vancouver, Winnipeg and Halifax.

Many jobs in the aerospace and defence electronics sector demand advanced skills and are high paying. Responding to the continuous need for improved design and production technologies, sector firms have organized teams of specialist engineers and technicians. The need to work with difficult materials and to extremely close tolerances has led to development of a highly skilled production work force.

Worldwide, the sector is customarily viewed in terms of three tiers. In Canada, the **first tier** consists of approximately a dozen *primes* — companies that have integrated design, development, manufacturing, marketing and product support facilities for complete systems. These firms are supported by approximately 80 **second-tier** component suppliers such as manufacturers of airframe sub-assemblies, major aircraft components or subsystems, connectors, and printed circuit boards. Competition among second-tier firms

is especially fierce whenever initial supply contracts for new programs are put up for bid, since it can be both awkward and expensive for prime companies to change suppliers later. Primes exercise their considerable power during the bidding process, wringing concessions from aspiring suppliers. After contracts have been awarded, however, both parties, out of mutual self-interest, work hard to establish a strong and close relationship that may continue throughout a 15 or 20-year program. The **third tier** consists of suppliers of services such as machining and electroplating. These suppliers are usually small Canadian-owned enterprises located close to their customers.

Foreign ownership is widespread, particularly among the largest establishments and in the defence electronics subsector, where seven of the 10 largest companies are U.S. owned, and another is British owned. The major Canadian-owned firms in the sector include the Canadair Aerospace Group of Bombardier, CAE Electronics Ltd. and Spar Aerospace Ltd.

Survival in the aerospace and defence electronics sector requires continuous new product development, an activity that entails significant high-risk, front-end investment (often equal to a prime manufacturer's net worth). Access to adequate capital is therefore essential. On civil aerospace programs, the market and engineering risks are compounded by extensive price competition and narrow profit margins. Military and space programs have historically been more assured, due to the highly specialized nature of government requirements, although this is changing and military requirements are being scaled back. Consequently, only companies with a dominant market position or a significant involvement in ongoing military and space programs have been able to generate sufficient internal funds and attract the private capital needed to finance long-term, high-cost product development activities.

Governments worldwide have regularly stepped forward to provide their aerospace and defence electronics sectors with adequate access to capital. In fact, the involvement of national governments in the aerospace industry as owners, financiers and principal customers is much more pervasive than in most other industries. This intimate relationship stems from the industry's strategic significance in national defence (maintenance of a defence production capability) and its contributions to national prestige, trade balances, economic growth and regional development.

Performance

Since the late 1970s, the Canadian aerospace and defence electronics sector has enjoyed strong growth. Between 1983 and 1990, real output increased by 90 percent and employment grew by 74 percent (27 000 workers). While civil aerospace markets have remained robust throughout the 1980s, defence electronics markets stagnated by the last years of the decade as foreign governments (particularly the U.S.) cut back on defence spending.

With only limited Canadian demand, the sector has achieved growth through exports. Typically, the sector exports 80 percent of its shipments, although above-average levels of domestic procurement during the late 1980s temporarily lowered the sector's export orientation to approximately 70 percent. The value of exports in 1990 was \$6.1 billion, approximately 75 percent of total output.

The U.S. is the most important trading partner for Canada's aerospace and defence electronics sector. Most defence-related firms in Canada have close ties (often through ownership) with the major American defence contractors. As well, much of the Canadian sector's subcomponent production for civil aircraft has been delivered to Boeing and McDonnell Douglas, the two U.S. airframe manufacturers that have dominated large commercial jet markets. In recent years, however, Canadian firms, most notably Canadair/Bombardier and Dowty Canada, have succeeded in winning major supplier contracts with the European Airbus consortium. In addition, Canadian suppliers of air traffic control systems and space systems are achieving growing sales in markets such as the U.K., Australia, the Caribbean and the Middle East. As a result, the share of Canadian

exports shipped to the U.S. (approximately 62 percent) is expected to decline.

The U.S. is also the primary source for certain key components of Canadian products (such as aircraft avionics and electronics components). Approximately 90 percent of materials, supplies and subcomponents that are imported by the sector originate in the U.S. As a result, Canadian-produced aerospace and defence products have, on average, a 25 percent U.S. content.

Aircraft and Aircraft Parts Industry (SIC 3211) Data

International trade and labour productivity data from Statistics Canada are available for only the Aircraft and Aircraft Parts subcomponent of the aerospace and defence electronics industry. These data, particularly for the U.S., are dominated by the sales of large commercial jet transports and military aircraft for which the Canadian industry has supplied some sub-assemblies and components. The trade data indicate that between 1983 and 1988, Canadian producers maintained their share of the huge U.S. market (approximately 1.5 percent). Over the same period, the U.S. share of the Canadian market fell from more than 75 percent to less than 50 percent, less because of any decreased reliance by Canadian customers on imports (which fell marginally from 80 percent of the Canadian market in 1983 to 75 percent by 1990) than because of a sharp decline in the U.S. share of Canadian imports from over 90 percent to less than 70 percent by 1990.

Since 1983, labour productivity in the aircraft and aircraft parts industry in Canada has shown steady gains, up 32 percent by 1987, versus growth of only 11 percent for the U.S. industry. However, this improvement marked only a partial return to the per-worker output levels achieved by the Canadian sector prior to the 1981-82 recession. In fact, according to Statistics Canada data for SIC 3211, there has been virtually no change in real output per worker in the industry since the early 1960s, whereas real output per worker tripled for the transportation equipment industry in Canada during the same period. Most observers find this disturbing, since the aerospace and defence electronics sector has made significant investments in machinery and equipment over the last decade.

Strengths and Weaknesses

The success of the Canadian aerospace and defence electronics sector throughout the 1980s was due to its ability to design, develop and produce highly specialized and advanced technology products for selected market niches: to the strong business-government partnership that has developed; and to the open access to international markets for civil aerospace products that has been achieved through multilateral trade agreements. In the defence electronics and space subsectors, domestic procurement policies played an important role in positioning Canadian companies within market niches.

Strong Canadian performance during the 1980s is also related directly to the sector's focus on civil markets. Less than 30 percent of the sector's output is delivered to defence clients, versus over 60 percent in the mid 1960s. With its developing civil market focus, the Canadian industry was well positioned to capitalize on the strong growth in air travel demand that occurred throughout the 1980s, and in particular on the demand for new turboprop aircraft brought on by the deregulation of air travel in the U.S. (by far the largest market for commercial transport aircraft).

A number of factors have constrained the performance and growth of the sector: the structure of the sector; difficulties in recruiting and maintaining a highly skilled labour force; the persistence of non-tariff barriers in international defence markets; and the limited product mandates under which some foreign subsidiaries operate.

Technology

The Canadian industry invests about 10 percent of total sales in R&D. Although this is high relative to most other industry sectors, aerospace and defence electronics is among the most R&D-intensive industry sectors worldwide. R&D investment rates in Canada are low relative to those attained by the aerospace and defence industries of the U.S., France and the U.K. The comparable rate in the U.S. is 17.5 percent of sales, while the OECD average is 16 percent. Data collected in recent surveys¹ indicate that the R&D investment rate (as a percentage of sales) is declining in Canada.

¹ Each year ISTC, in cooperation with the Aerospace Industries Association of Canada (AIAC) surveys the sector.

Despite recent cutbacks, many of the nations competing with Canada have large defence requirements that generate high levels of government-supported R&D activity. With much more modest defence programs, Canada's R&D expenditures tend to be driven by international civil market opportunities and are often at the development end of the R&D spectrum. Basic research in Canada is led by educational institutions and government laboratories.

While the R&D focus on product development has been critical in developing many of the niche products for which the Canadian sector is acclaimed, manufacturing and process R&D have been neglected. This partially accounts for the failure of the sector to substantially increase output per worker during the last 25 years.

Government Support

A cooperative relationship between business and government has developed in this sector, paralleling similar relationships in all competitor nations. Since private investors generally view investments in aerospace as unattractive because of the high risk and the lengthy investment/return cycles involved, most companies within the world's aerospace industry rely on retained earnings for investment capital, supplemented by substantial government support of some form. While federal and provincial government support to the sector in Canada is probably low relative to assistance levels provided in Italy, France, the U.S. and the U.K., it has nonetheless been instrumental in promoting a steady improvement in R&D capabilities and in assisting the industry to maintain a high level of new product development activities over the past two decades.

In the late 1970s, the Canadian government's involvement in the sector extended to a temporary ownership role of both Canadair and de Havilland. Both of these firms were privatized in the early 1980s. While industry privatization has also occurred recently in the U.K. and Germany, governments in key competitor nations such as France and Italy still maintain an equity position in their aerospace and defence electronics sectors.

ISTC direct support, provided through the Defence Industry Productivity Program (DIPP), accounted for approximately 16 percent of the \$1.3 billion spent on new investments by the sector in 1990, and for 20 percent of R&D investment. The DIPP assists Canada's aerospace and defence-related industries to become internationally competitive. The Defence Industry Research Program (DIRP), operated by the Department of National Defence, also provides direct assistance to firms to improve the research and technological capabilities of the Canadian defence industry. Firms have also responded, investing heavily in product research and in new production equipment and facilities. Typically, 60 to 70 percent of total industry investment each year is directed to R&D activities, 5 to 15 percent for new plants, and 20 to 30 percent for machinery and equipment.

The Canadian government has also used major procurements for nurturing growth in the aerospace and defence electronics sector. Much of the development of Canada's capability in air traffic control and satellite systems has resulted from initial contracts to supply products and services to the Canadian (government) market, which subsequently led to export sales.

There are several examples where the sector has been developed and strengthened through government procurement policies; these include Spar Aerospace, Raytheon, MacDonald Dettwiler, Bristol Aerospace, Prior Data Sciences and Litton Canada. It should be noted, however, that the majority of procurement projects have been for defence requirements. With the worldwide shrinkage in defence budgets, there is the question of whether the use of procurement leverage will continue to be effective for the aerospace and defence electronics sector.

International Trade

Since the domestic market for aerospace and defence electronics goods and services is not large enough to sustain the Canadian sector, access to international markets is critical to its long-term viability. For civil aerospace products in particular, improved access has been facilitated by trade agreements and other bilateral trade arrangements. For instance, most of the Canadian sector's products (except defence electronics) are traded in an essentially tariff-free market environment established under the Civil Aircraft Code of the GATT. This code eliminates tariffs and

restricts non-tariff barriers on trade of most civil aircraft products among signatory nations.

To a lesser extent, barriers to trade in defence products have been relaxed through special bilateral arrangements, most notably the Canada-U.S. Defence Production Sharing Arrangement (DPSA). However, there are still many non-tariff barriers and protectionist measures that inhibit Canadian firms from exploiting defence market opportunities in the U.S. and elsewhere.

Despite attempts within the GATT Civil Aircraft Code to constrain such practices, offset requirements (which became prevalent in defence markets during the 1970s and early 1980s) have begun to appear in civil aerospace markets. Most major commercial transport aircraft purchases outside North America are made by national airlines that are either owned or heavily influenced by domestic governments. In some newly industrialized countries, and even in some European countries, sourcing decisions for government and quasi-government acquisitions of civil airframes and propulsion systems are influenced by industrial benefits and offset considerations. Not only has this led to a smaller proportion of each airframe or engine being manufactured in its nominal country of origin, it has also meant fewer opportunities for Canadian firms to become or to remain suppliers to foreign aircraft or engine programs.

Industry Structure

Few firms in the Canadian sector are large enough to participate in partnerships with foreign firms, and not all of these have yet entered into such arrangements. During the 1980s, the trend toward strategic partnering among the world aerospace companies and the mergers and consolidations that occurred in the European defence industry were reactions to the increasingly high cost and risk of aerospace and defence product development programs. Although partnerships tend to reduce competition, they also mitigate the risk and cost of product development, provide some buffer against exchange rate fluctuations, and usually improve access to new markets and thus lead to increased market share.

A more recent development has been the requirement for second-tier suppliers to enter risk-sharing arrangements with primes at an early stage, sometimes prior to the R&D development phase of an aircraft project. If, because of their size, small

Canadian suppliers cannot raise the necessary capital, they may be unable to participate in attractive new projects — resulting in severe long-term consequences.

Unlike its major foreign competitors, the Canadian sector emerged from the 1950s with only limited vertical integration. While some second-tier firms have evolved from their reliance on programs of either Canadian primes or of the Department of National Defence into fully competitive international suppliers, other second-tier firms and most third-tier companies are handicapped by their small size. These companies generally lack the ability to penetrate export markets and rapidly adopt new manufacturing and process technologies. This handicap, together with the lack of proprietary products and processes, tends to render some of these companies vulnerable to competition from the low-cost, newly industrialized countries. Smaller companies that do not fall into this category typically have highly specialized, knowledge-intensive skills.

Skilled Labour Availability

Availability of skilled production labour and experienced technologists and engineers is a continuing concern of the Canadian industry. In the past, first and second-tier firms were able to attract experienced technical staff from Europe and, specifically, the U.K. Most of these technical staff are approaching retirement, so replacements must be found. The continual introduction of the latest manufacturing technologies also places new demands on production workers. Companies must introduce programs for a steady upgrading of work force skills.

To some extent, the industry lacks the infrastructure to train newly graduated technicians and engineers to replace its highly experienced employees. In Quebec, the industry is working with universities and educational institutions to establish curricula and training programs in the Montreal area that address industry needs. Similar initiatives on a national scale and in other provinces have not been as fruitful, although there are isolated examples, such as Canadian Marconi in Cornwall, Ontario, and Menasco in Oakville, Ontario, where individual companies have joined with local educational institutions to establish successful programs.

Foreign Ownership

The heavy foreign ownership of first and second-tier firms in the sector has given rise to both strengths and weaknesses. On the one hand, well-managed subsidiary firms have had better access to state-of-the-art technology and to marketing and management assistance than might otherwise have been the case for similarly sized independent operations. Foreign ownership has also eased access to some foreign markets and has been particularly beneficial when world product mandates for certain products have been gained by Canadian subsidiary operations. On the other hand, indigenous R&D capabilities may tend to be underdeveloped (Pratt and Whitney Canada being a renowned exception). In some cases, parent organizations have set up Canadian subsidiaries solely to serve the domestic market, leading to a highly truncated operation providing little long-term benefit to the development of the sector in Canada. On balance, foreign ownership has been advantageous for the Canadian sector during the 1980s.

Outlook for the 1990s

The world market outlook for the aerospace and defence electronics sector is positive, despite the anticipated moderation in defence spending by many countries. Due to increased demand for air travel, strong long-term growth is predicted for civil aerospace markets, particularly for large civil transport aircraft. This bodes well for the significant portion of the Canadian sector that is concentrated in the civil market.

Markets for space systems are also expected to maintain healthy growth rates over at least the next decade. However, the Canadian defence electronics subsector will probably experience the greatest pressures in the post-1991 years, and will have to struggle to maintain current sales levels.

The broad customer base, markets and product mix of the sector should minimize the impact of short-term market downturns. However, the Canadian sector will have to react to a number of trends affecting the international aerospace and defence electronics sector if it is to continue growing throughout the 1990s.

Globalization and consolidation of the international sector are continuing in several areas. Defence electronics firms in Europe have already undertaken major consolidations, and their stronger marketing presence in export markets is increasingly evident. One area of particular concern for Canada is commuter and regional transport aircraft, where overcapacity exists and where there are too many participants to support profitable operations. Consolidation is expected in this area, with important implications for the Canadian industry.

Defence budgets in NATO countries are expected to decline throughout the 1990s. Foreign defence-based companies can be expected to focus aggressively on civil markets, including those niches held by the Canadian sector. As well, the competition for the reduced amount of defence contracting will be more intense, and could involve increased protectionism in the U.S., where the production infrastructure has been *overbuilt*. The result will be increased competition and likely a weakening of Canada's defence-customer base. In the end, it will prove more difficult for Canadian defence firms to maintain sales and to finance R&D.

Prime manufacturers are expected to further reduce their supplier networks, using far fewer suppliers but awarding long-term procurement agreements that require risk-sharing (e.g. up-front capital) from second-tier suppliers. Small and less-competitive suppliers will suffer.

Because of the enormous costs involved, virtually all major new programs will be undertaken by international consortia. Canadian companies may be excluded from these opportunities if they are unable to bring adequate money and markets to the table. This will open the door for recent entrants to the international sector, such as Japan and Korea (Japan's significant share of the new Boeing 777 aircraft program is a good example of this trend). There is less possibility of new entrants to the defence industry because of strategic concerns of the U.S. and other major customer-producer nations.

As the sector matures, cost competitiveness will be an increasingly important success factor. The increased emphasis on price and total quality will likely make certain foreign sources more competitive. The Canadian sector will have to continuously

improve productivity, partly through increased R&D in manufacturing technology in product areas such as commercial aircraft, where a degree of standardization exists. Management practices will have to be re-oriented. Labour-management relations will be challenged to adapt so as to establish the shop-floor-level flexibility that encourages implementation of new techniques and practices.

Foreign governments will continue playing a major role. For instance, U.S. defence firms are likely to continue receiving full assistance for their R&D efforts, and should be able to establish a technology-based competitive advantage.

The industry has begun examining its competitiveness. Recently, industry leaders in Canada expressed concerns about their ability to compete in the 1990s. Governments should cooperate with the sector to develop a common understanding of the issues affecting competitiveness. Among services that governments can offer are data collection, benchmarking, and other improved analytical and comparative techniques.

A Sectoral Agenda for International Competitiveness

Globally, governments' support for aerospace and defence industries is forecast to continue at current levels, since most industrialized and newly industrialized countries treat aerospace as an instrument of government policy.

The Memorandum of Understanding between the Aerospace Industries Association of Canada (AIAC) and ISTC and their Work Plan can be effective vehicles for the strategic planning of joint industry-government actions for improving the competitiveness of the sector.

Industry-government cooperation should continue within the framework of Memoranda of Understanding with major companies that set out principles to facilitate long-range business planning and foster long-range focused R&D by the industry.

Canadian industry and the federal government must continue working together to ensure that government assistance remains adequate for changing international circumstances.

Productivity

Canadian aerospace firms need to develop a better understanding of new techniques of measuring and comparing productivity. They must develop a clearer view on competitiveness gaps in process technologies and productivity through such techniques as benchmarking.

The Canadian government can assist by working with AIAC and industry subgroups to collect and disseminate sector comparative and compilation analyses.

Manufacturing costs are becoming increasingly important to Canada's ability to compete as the international sector matures. Whereas foreign industry and governments have placed increased emphasis on improved manufacturing technology, Canadian industry has focused its R&D expenditures on product development.

Industry and government should review whether manufacturing process technologies intended to improve productivity should be given higher priority in allocating R&D funds and incentive instruments such as the DIPP.

Foreign companies, often supported by government, are initiating programs such as Total Quality Management at a faster pace than Canadian industry. The Canadian government, in collaboration with AIAC, recently undertook a survey to establish the degree of awareness and usage of Total Quality Management within the sector. This initiative should proceed to its next phase, which is to encourage adoption of Total Quality Management more widely throughout the sector. Labour and management must re-examine their historical relationship, and establish a mutually beneficial partnership that will facilitate rather than hinder the adoption of new productivity-enhancing processes and techniques.

Skilled Labour Availability

The industry should champion the extension of the broad, cooperative model (developed with industry, provincial governments and educational institutions), which has proven successful in Quebec, to other provinces with significant aerospace industries.

A solid first step will be undertaking a human resource assessment study for the sector to provide the basis for developing a human resource strategy. Industry could work with the newly established

Labour Force Development Board to identify future training requirements for the sector.

Firms in the sector will have to increase their investment in work force training to international standards.

R&D, Innovation and Product Development

Short-term goals and investment strategies are antithetical to the long-term planning and R&D investments that are needed to be successful in the year 2000 and beyond. Industry must lengthen its planning horizon in order to stimulate the necessary investments.

Canada's second-tier firms must take the initiative in strengthening their R&D capability, thereby enabling effective supplier development and broadening the range of proprietary products supplied from Canada.

The DIPP at ISTC and the DIRP at DND, as well as complementary support from other instruments at the federal and/or provincial levels, can be used to assist this process.

Industry Structure

Government and industry must work together to anticipate and capitalize on industry restructuring in the face of new market and production realities. Worldwide, industry and governments will become engaged in a rationalization of the industry that will force a Canadian response. Government decisions and actions will play an important role in determining the position of Canadian industry in this new world order.

The export successes of first-tier firms can be used to strengthen second and third-tier suppliers in Canada, provided that first-tier firms undertake substantive supplier development initiatives in order to build stronger linkages between the tiers, and maximize the flow of technology and management know-how down to lower tiers.

Market Access

As the level of competition for new business heightens, the Canadian aerospace and defence sector must become more aggressive in seeking out new sales opportunities in non-traditional markets.

The sector's continued success and growth depends on maintaining free access to markets worldwide. The AIAC, in collaboration with the federal government,

should establish a mechanism to monitor the international market. The government, as necessary and through appropriate means, should challenge foreign governments if unacceptable entry barriers to foreign markets arise.

Canada should support multilateral efforts to impose universal disciplines on subsidies in the aerospace and defence sector, including sales financing. Without these international agreements, the competitive position of major Canadian companies may be seriously compromised.

The industry needs to recognize globalization as a factor, and expand its collaborative arrangements with foreign companies to improve market entry. Governments can facilitate industry's efforts by anticipating the sector's need to share manufacturing benefits with foreign companies so as to gain market share in their countries.

Export control policy affects the export potential of the sector in both defence and civil markets. In light of recent changes in East-West relations, the federal government should continue cooperating with its NATO partners and Japan in the review of COCOM (Coordinating Committee for Multilateral Export Controls) policy and criteria in light of recent changes in East-West relations.

THERE ARE THREE MAJOR WORLD MARKET AND PRODUCTION AREAS FOR automotive products: North America, Europe and Pacific Rim countries. Projections of vehicle sales during the 1990s indicate vehicle demand in most developed countries is approaching saturation and future sales will come from the replacement of existing vehicles rather than expansion of the market. Competition in such an environment will be fierce. The skirmishes waged over market share during the past decade appear to have been but a prelude to battles that will be fought in the next decade. Canadian automotive companies, as integral members of the North American industry, will not escape the fray and must be competitive to survive. The following sections trace the recent history of the Canadian industry, explain the major factors directing its performance and set out an agenda for consultation by business, labour and government to ensure the continued success of the Canadian automotive industry.

Structure

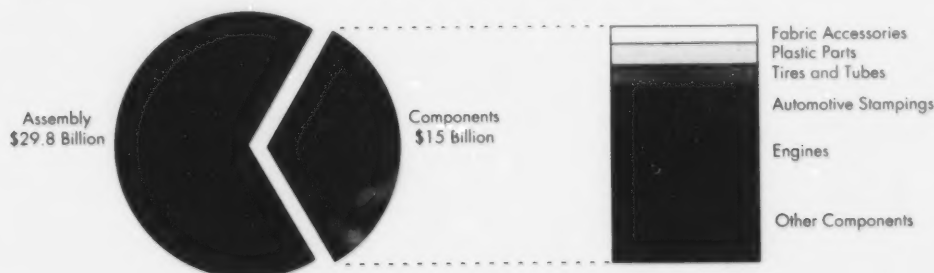
The two major industry subsectors that constitute the Canadian automotive industry are vehicle assembly and automotive components. Each subsector comprises distinct areas: in vehicle assembly, there are light vehicles (passenger cars and light trucks), heavy-duty trucks and specialty vehicles; and in automotive components the more important areas are makers of engines, automotive stampings, tires and tubes, plastic parts and fabric accessories. Other subsectors include steering and suspension assemblies, transmissions, wheels and brakes, and aftermarket parts and accessories (Chart 1).

Although the vehicle assembly subsector is the larger in terms of the value of its shipments, the automotive components subsector employs almost

60 percent (99 000 people) of the total number of workers and its contribution to value added is also almost 60 percent of the total. Of the 75 000 people employed in vehicle assembly, the majority (70 percent) is engaged in the production of light vehicles.

Plants in the automotive industry throughout Canada and the U.S. are rationalized to minimize duplication of production processes and to increase value added by coordinating outputs. This harmonization was initiated by the Canada-U.S. Automotive Products Trade Agreement (*Auto Pact*) and is continued under the FTA. North American automotive production in both components and assembly is geared almost entirely toward the Canadian and American markets, with limited exports to other countries. While most U.S. production is domestically consumed, more than 80 percent of

**CHART 1
MAJOR SECTORS BY VALUE OF SHIPMENTS,
1990**



Source: ISTAT.

Canadian production is exported to the U.S. Exports to third countries amount to \$700 million, mainly in parts, but account for only 2 percent of total Canadian automotive exports.

Canadian assembly is dominated by light-vehicle assembly (passenger cars and light trucks), with almost 2 million units produced in 1990, compared with only 23 000 heavy-duty trucks and approximately 5 000 specialty vehicles. In light-vehicle assembly, production is divided, with 60 percent in passenger cars and 40 percent in light trucks. Because of the overwhelming size of the U.S. portion of the North American market, product rationalization means that over 85 percent of Canadian assembly output is exported to the U.S. Canadian production is therefore almost totally dependent on U.S. market conditions.

The assembly sector is totally foreign-owned. The most important producers remain the U.S.-based companies known as the Big Three (General Motors, Ford and Chrysler). During the past decade, Canadian plants received a high level of investment from the Big Three and all plants in Canada (with the exception of two small facilities) either have been or are in the process of being fully modernized. Three of these plants have been instructed by their parent companies to produce new products, and all are technologically competitive on a world scale. However, despite this investment, it cannot be assumed that all assembly plants are safe. While the Canadian operations of the Big Three have been able to largely escape the closures that the American plants faced in the past decade, continuing over-capacity in the industry could lead to further closures, and Canadian plants may not be able to totally escape the down sizing.

More recently, the structure of the North American industry changed with the entry of Asian automakers. Almost all Japanese automakers now have assembly plants in the U.S. Toyota, Honda, Suzuki (Japan) and Hyundai (Republic of Korea) have assembly plants in Canada. Canada received almost \$2 billion in Asian investment in the late 1980s to establish these four new assembly facilities, which represents 20 percent of the total Asian investment in vehicle assembly in North America. While the capacities of three of these facilities are small

relative to the new Asian world-class plants in the U.S., Canadian plants are technologically advanced and a the *lean manufacturing* approach appears to make them competitive. These new transplant facilities in Canada and the U.S. are now responsible for over 15 percent of North American vehicle production.

As in vehicle assembly, Canadian automotive component production is rationalized on a North American basis, with exports oriented toward the U.S. Over 80 percent of component shipments are directed to the Big Three. There are over 600 major component establishments in Canada, compared to more than 4 000 in the U.S. Both the assembly and components sectors are principally located in Ontario and Quebec. There are, however, several automotive firms located in other parts of the country. For example, the majority of the heavy-duty trucks produced in Canada come from British Columbia; the Prairies are home to many of the specialty-vehicle manufacturers, and Canada's largest tire producer is in Nova Scotia.

Over 50 percent of the value of Canadian production is from a relatively small number of captive producers; that is, several large engine, transmission and trim plants are owned by and are vertically integrated into the production of the Big Three. Canadian-owned firms account for approximately 20 percent of total Canadian shipments, while foreign-owned multinational enterprises, primarily American owned, account for the remaining 30 percent. Investment by Japanese component manufacturers has been directed mostly toward the U.S., with minimal investment in Canada to date.

Performance

Assembly

Between 1980 (a relatively low year) and 1989 (a productive year), the value of shipments in the Canadian assembly sector grew by almost 120 percent (in terms of constant 1981 dollars), while the number of units produced increased by 50 percent from 1.3 to 2 million units. U.S. shipments during this period increased by only 70 percent in terms of value and 40 percent in terms of volume. Overall, the Canadian share of North American vehicle production during the decade grew from 14 to 15 percent.

A major cause of this growth in the Canadian assembly industry was an increase in vehicle demand in North America. Retail sales of motor vehicles in the U.S. increased by 36 percent from an annual level of approximately 11 million units in 1980 to a level in excess of 15 million by the end of the decade. In Canada, there was a 50 percent increase in the number of vehicles sold, with retail sales in 1989 approaching 1.5 million vehicles.

Substantial gains in both productivity and cost efficiency also contributed to the growth in Canadian assembly. In terms of labour productivity, the gains made in the 1980s have been consistently impressive. There was a 20 percent increase in the average number of vehicles produced by each assembly worker; in 1980, output was averaging 40 vehicles per worker, but by 1988 this had risen to 48 vehicles. A recent study of the North American industry¹ concludes that the most productive plant on the continent is located in Canada and that two of the top five are located in this country. Equally significant has been the increase in value added. Manufacturing value added per production worker in 1988 was 2.5 times greater than it was in 1980. In 1980, the value added per production worker was almost \$50 000, by 1988 this had increased to almost \$120 000.

In terms of costs, slightly fewer improvements have been made in the Canadian assembly operations. The costs of motor vehicle assembly have increased at a slower rate than the value of motor vehicles. Between 1980 and 1988, the average material cost per vehicle increased by 62 percent while the average value per vehicle increased by 65 percent. Both material costs and wage costs, when expressed as a percentage of the value of shipments, have been decreasing during the past decade. Wage costs decreased from almost 7 percent of the value of shipments to slightly more than 6 percent, while material costs decreased by over 2 percent relative to the value of shipments. Compared with American plants, Canadian automotive assembly has a significant cost advantage because it pays less on hourly wages to workers (after currency adjustments) and on fringe benefits, particularly health care costs.

Components

In the Canadian automotive components sector, shipments increased by over 160 percent (in constant 1981 dollars) between 1981 and 1989. Annual growth of the Canadian industry was almost 20 percent. Canadian producers increased their share of North American production from 6 percent in 1981 to 11 percent in 1989. Employment in the industry increased from 52 000 in 1981 to 99 000 in 1989. The number of establishments principally engaged in manufacturing automotive components grew from 344 to 630.

Perhaps even more significant was the increase in market share that Canadian producers were able to achieve. Their market share of all parts used by U.S. vehicle assemblers (including Asian transplants) increased from approximately 8 percent in 1982 to 11 percent in 1989. This occurred despite the following two factors:

- Light-vehicle production by the Big Three, the traditional market for Canadian components, declined from 98 percent of North American production to 88 percent, although growth in total output was substantial. The components industry in both countries also had difficulty finding outlets for their production among transplant assembly facilities, which look primarily to their offshore networks for sources of components.
- The very favourable exchange rates of the mid 1980s, when the Canadian dollar dipped as low as US\$0.69, consolidated the gains made by the component manufacturers in the U.S. markets between 1982 and 1984.

Recent anecdotal evidence appears to point toward a deterioration in performance in this sector, although it is not clear at this point whether a structural shift is occurring or whether the industry is adjusting to decreased business opportunities resulting from the recent recession.

¹ *The Harbour Report: A Decade Later* (James E. Harbour, et al., Rochester, MI: Harbour and Associates, 1990).

Strengths and Weaknesses

Assembly

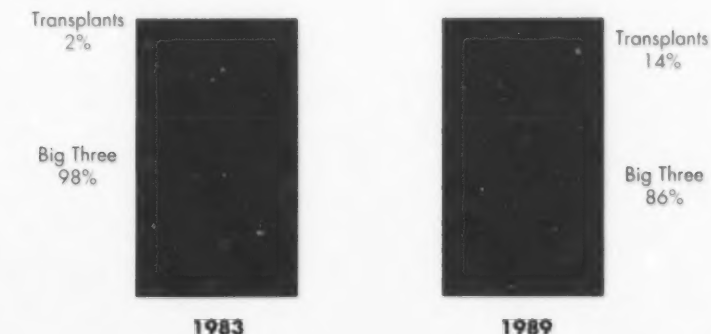
A major factor influencing the assembly industry is the growing popularity of Japanese vehicles in the North American marketplace. Following the second oil-price shock of the late 1970s, Japanese vehicle imports peaked at almost 23 percent of the U.S. market and 25 percent of the Canadian one by the end of 1982. Following the introduction of voluntary export restraints in both countries, Japanese vehicle producers refined their ability to produce high-quality vehicles that were in demand by consumers and gradually began producing more expensive automobiles in competition with model classes previously dominated by the Big Three. Other overseas producers (notably Hyundai) moved into the low end of the market vacated by Japanese automakers and, for a time, were able to command a substantial market share. The market share for European vehicles remained constant accounting for 5 percent. The overall result was a 10 percent decline over the decade in market share for domestically produced cars among the Big Three (especially General Motors) in Canada and the U.S. to a level of about 64 percent.

Although imports in North America steadily increased, the period from 1981 to 1989 also had corresponding increases in the total number of motor vehicles produced in North America. Production grew at an average annual rate of 4 percent, going from 9 260 495 units in 1981, to 12 824 357 units in

1989. At the end of the decade, much of the growth in production was due to the opening of new transplant facilities. However, despite this increase in production, a major problem developed in terms of overcapacity. The Big Three responded by restructuring their operations through a combination of closures of obsolete plants, plant conversions and product rationalization in new facilities. However, by the early 1990s, the amount of excess Big Three capacity in North America was still high in light of the predicted continued weak growth in demand. In addition, the overcapacity of foreign assemblers in their home market continued to pressure Asian automakers to promote exports to North America.

The growth of transplant vehicle production in the past decade is another factor that has significantly shaped the industry. Starting with a plant opening by Honda (Ohio, 1983), and followed by more openings by Nissan (Tennessee, 1985), NUMMI (California, 1986), Mazda (Michigan, 1987), Honda Canada (Ontario, 1987), Diamond Star (Illinois, 1988), Toyota (Kentucky, 1988), Toyota Canada (Ontario, 1988), Hyundai (Quebec, 1989), Suzuki (Ontario, 1989) and Isuzu (Indiana, 1989), total transplant production increased dramatically during the period, ending 1989 with a North American production volume of 1 131 675 units. As a result, the relative share of production by the transplant producers leaped to 14 percent of the total North American market (Chart 2).

CHART 2
RELATIVE SHARE OF PASSENGER CAR PRODUCTION,
BIG THREE vs. TRANSPLANTS



Source: ISTAT.

The shift in production has not, however, significantly reduced vehicle imports from Japan. In 1989, for instance, 29 percent of the U.S. passenger car market was served by overseas imports, with 21 percent coming from Japan. Clearly, a major structural shift has occurred, with Japanese vehicle manufacturers taking a 30 percent market share through combined imports and North American production. These trends are not as clear in the light-truck market, although the Japanese automakers again have been the dominant importers.

Controlling this competitive milieu is the automotive trade policies of Canada and the U.S. Government policy, especially trade policies, has an important and significant impact on the industry. Historically, the major trade policy instrument was the *Auto Pact*, which was implemented in 1965. Under its terms, vehicles and parts enter Canada duty-free from countries having Most Favoured Nation (MFN) status, subject to a condition that participating Canadian assemblers meet certain manufacturing performance requirements. Meanwhile, the U.S. only allows duty-free entry of Canadian automotive products having at least 50 percent North American content. As a result of the *Auto Pact*, assembly and large component operations of the Big Three in Canada have been rationalized to realize the economic benefits achieved through large-scale production, made possible by duty-free access to the U.S. market, which was not available when the market was subject to tariff constraints. Canada also implemented automotive duty remission programs for companies that met certain performance standards and extended general duty drawback provisions to assemblers that did not otherwise qualify for duty-free entry under the terms of the *Auto Pact*.

The FTA incorporates the *Auto Pact* provisions and offers duty-free access to the U.S. market for all producers in Canada, if the products meet the required North American value-added level of 50 percent. However, since *Auto Pact* safeguards are connected to the level of tariffs for vehicles and parts, as bilateral tariffs disappear under the FTA, the effectiveness of safeguards becomes increasingly dependent upon the level of the MFN tariff and the amount of overseas imports. In isolation, the elimination of the duty drawback on exports to the U.S. in 1994, and the elimination of automotive remission

programs in 1996, could increase the cost of production for non-*Auto Pact* companies because Canadian MFN tariffs on parts are higher than the corresponding U.S. tariffs. However, the multilateral trade negotiations currently taking place under the auspices of the GATT are expected to result in MFN tariff changes to ameliorate this situation.

Components

A major restructuring has also been taking place in the automotive components industry throughout the late 1980s and early 1990s. The economic downturn in business activity in Canada and the U.S., beginning in 1990, triggered the closure of a number of plants. Initial indications are that, in most instances, the closures have been subsidiary plants of U.S. firms that have not received the reinvestment from the parents that was necessary to keep them operating competitively. However, the problem may be more deeply rooted. Companies are being pressured by U.S. customers to lower prices at a time when the rising value of the Canadian dollar in terms of U.S. currency is forcing prices up. In addition, since many companies do not appear to have made the necessary productivity improvements and have not increased their technological capability, they may be vulnerable to competition from the southern U.S. and Mexico, where wage rates, and hence overall costs, are lower.

Perhaps more importantly, the past decade has witnessed a fundamental shift in the manner in which business is conducted between components producers and assemblers. Not only has there been a concerted move toward a more formalized tier structure similar to that found in the Japanese industry, but also other Japanese-style systems of *lean production* have been adopted. For example, as the number of suppliers each assembler deals with falls, the relationship with the remaining companies becomes fundamentally changed. Companies are increasingly charged with more responsibility for design and for greater levels of product R&D. Long-term contracts are more common, but assemblers are demanding cost reductions, forcing supplier companies to revise their production processes. In addition, there has been a great deal of change in the process of supply, with greater use of Just-In-Time delivery (and to a lesser extent manufacturing) and sub-assembly of major components such as seats and instrument panels.

Further complicating the environment is the move by some of the Big Three to obtain more of their components in-house. A great deal of confusion and uncertainty has occurred and will continue as American and Asian assemblers attempt to redefine the role of the supplier. The result will be a critical determinant of where and how product and process development is conducted. Overall, the assemblers have overwhelming power in the relationship and are forcing change at an unprecedented pace in an effort to maintain or even strengthen their competitiveness.

Canadian producers of automotive components have been relatively successful. While few Canadian companies are among the first tier of producers that are taking on greater responsibility for design and product development, they have nonetheless faced many of the pressures of the U.S. first tier producers. A recent study² on the competitiveness of the North American components industry concluded that comparable facilities in either Canada or the U.S. are competitive, regardless of their distance from the market core. Mexican plants have the lowest wage costs, but this advantage is often offset by lower productivity, poor infrastructure, high turnover and fewer skilled workers, although the situation is changing rapidly. However, the study also concludes that *greenfield* facilities are significantly more competitive than older plants. This may have a significant impact on the future of Canadian competitiveness, since Canada has not received a commensurate share of Asian investment in the automotive components industry. This investment has resulted in the establishment of some 250 new plants in the U.S. Further, neither the traditional assemblers nor the traditional independent suppliers have constructed many *greenfield* components facilities in Canada recently, although Europeans are finding Canada an attractive location for investment. While most Japanese component facilities have been established to serve the transplant assemblers, it is likely that these plants will expand their market to the Big Three in order to obtain the economies of scale necessary to become fully competitive. Canadian producers will increasingly meet them in direct competition.

Evolving Environment

The competition in the automotive industry continues to intensify for both the assemblers and the components manufacturers. Not only is demand projected to stagnate during the next decade, but also, consumers are becoming more demanding in terms of their expectations for quality, safety and performance. In addition, both legislators and consumers are demanding that vehicle manufacturers reduce vehicle emissions while simultaneously increasing fuel economy. As a result, continuous productivity improvements that lead to the efficient production of high-quality products are minimum requirements. To be successful beyond that, companies will have to compete on the basis of innovative products, as well as innovative production processes.

As a result of technological advances, the requirements for highly skilled and highly trained workers in both the component and assembly industries have increased dramatically. This has placed great pressures on an individual firm's ability to find and train such workers. Increasingly, having a skilled and trained work force will be a basis for competition. The establishment of the Canadian Automotive Parts Sectoral Training Council, a labour-management initiative encouraged by government, is one measure being initiated to overcome this problem, but a great deal of work still lies ahead.

Outlook for the 1990s

With projected slow growth in the demand for motor vehicles in North America in the 1990s, the competition in the marketplace will continue to intensify. Over 80 percent of sales demand is predicted to be for replacement rather than for first-time purchases. Excess production capacity, which is projected to exceed 2.5 million units per year in North America by 1992, will increase competition further. In this environment, the market share held by the Big Three is expected to stabilize at a level slightly lower than what this currently held. The Japanese producers will achieve a slight increase in their total market share, although some of the smaller players may not be

² *A Comparative Study of the Cost Competitiveness of the Automotive Parts Manufacturing in North America* (Toronto: Booz, Allen & Hamilton Inc., 1990).

successful. In addition, Mexico has become an increasingly important player in the North American marketplace, even before any free trade deal involving that country is concluded.

The introduction of the GST in the past year has removed the inequities of the old tax structure. The GST has created a level playing field where domestically produced manufacturing inputs can compete fairly with imported goods.

The FTA assures market access to the critical U.S. market for Canadian producers. A potential NAFTA that includes Mexico is likely to provide opportunities for Canadian-based firms to integrate their operations into a larger North American context. Major shifts in worldwide automotive trading patterns are not expected, but developments in Europe must be monitored to ensure that emerging policies there do not exclude Canadian firms from potential market opportunities.

Efforts to protect the environment will increasingly become a critical factor. These efforts will provide both opportunities and challenges in improving manufacturing processes and in product technology such as using new materials and finding new fuel technologies.

In general, Canadian assembly facilities are well positioned to maintain their competitiveness. Most have received new product mandates, have shown themselves to be competitive in terms of both worker and process productivity, and have modern and technologically advanced production systems. Canadian firms still achieve significant productivity returns on their labour costs, which must be maintained in order to compete effectively with their U.S. counterparts.

The overall outlook for the components sector is more difficult to predict, but is generally less optimistic than that for vehicle assembly. Some components companies have made the necessary adjustments and are competitive on a world scale. Many are capturing new business opportunities, and a few have been successful in entering the Asian assembler market. Others are in the process of adjusting and can be expected to meet the new requirements successfully. However, some will not survive, and many that were reluctant to change have already closed. To survive in an increasingly competitive environment, industry and labour will have to address all the factors affecting this sector's competitive position, including productivity, training and technology. In turn, govern-

ments will have to carefully evaluate the impact of any new policies and regulations in the context of their impact on sectoral competitiveness.

A Sectoral Agenda for International Competitiveness

Over the past several years, the automotive industry has been adjusting to the growing need to introduce new production, design and marketing concepts. In the context of these global trends, the Canadian industry continues to operate in a largely regional North American market. Canadian industry, labour and governments have been working together to review practices and policies to ensure that they contribute to maintaining a competitive sector that operates near current output levels. The agenda for consultation focuses on two areas: a competitive industry and a competitive business climate.

A Competitive industry

Human Resources

- Initiatives aimed at upgrading the skills level on the shop floor and at the car service and retail level have been launched through the creation of an industry-labour committee and through the Canadian Automotive Repair and Service Council. It is now up to industry and labour to continue to work together closely to ensure that these succeed.
- The industry and the academic community, with the cooperation of labour and governments, are in a position to take the initiative to establish an automotive engineering specialization at the university level and to provide career streams for participating students. Much of the preparatory work for such an initiative has already been carried out in cooperation with governments.

Technology

- Canadian R&D tax credits are the most competitive in the world, but are not well understood by industry. An initiative is under way to remedy this situation through the publication by Revenue Canada of an *Application Paper*. Industry associations can now initiate a process of educating their members on the benefits of (and process of) using these tax credits. In addition, there remains a need to clarify the eligibility of capital assets when used for R&D.

- The automotive components sector, with the cooperation of governments and labour, is in the process of completing an analysis of the need for, and feasibility of, establishing an automotive technology centre.
- Automotive components companies will need to work closely with customers, suppliers, academics and governments to ensure that appropriate technology networks and facilities are established and utilized. Governments have a particular role in this regard to foster a supportive infrastructure, to encourage alliances and joint ventures, to disseminate relevant information on trends, advanced materials and technologies, and to encourage complementary investment in components production.
- Assemblers should identify technologies that could be exploited in Canada by the Canadian supply community. Initiatives to protect the environment and enhance user safety offer opportunities that should be pursued by industry.

Productivity

- Assemblers, in close cooperation with labour, are continuing to upgrade their facilities and to move toward *lean production* systems to ensure that Canadian plants retain a competitive advantage.
- Components companies recognize that continuous analysis of their total operations is required to reduce waste and to improve productivity. The Automotive Components Initiative offered by ISTC has, by encouraging companies to critically examine all their operations, demonstrated that substantial productivity savings are possible at minimal cost.

Marketing

- Components companies must continue to actively pursue the market of Asian transplant producers, including assemblers and newly established parts companies that are among the first tier of producers. The federal government has a role in facilitating this process.
- Opportunities in Mexico will increase and will provide new opportunities for the components sector.

- Niche opportunities also exist for components companies to service markets in Europe and Asia.
- Canadian vehicle manufacturers have an opportunity to actively market appropriate vehicles in Europe, Asia and Latin America. The federal government role is to redress any restrictive trade policies that hinder access.

A Competitive Business Climate

- The FTA establishes the framework for automotive trade between Canada and the U.S. However, a number of issues such as the level of North American value added, the international competitiveness of the North American industry, and the eligibility of certain costs in calculating what constitutes North American value added, have been raised by various parties and are in differing stages of study.
- A NAFTA involving Mexico can build on the positive aspects of the current FTA and provide Canadian industry with improved access to the larger North American market.
- In a rationalized industry there is a need to ensure that standards are complementary, to provide the greatest economies of scale in the North American markets.
- An evaluation of the effect on competitiveness of any new government policies or regulations, in consultation with industry and labour, should recognize that Canadian manufacturers are competing for investment and markets in the context of a North American free-trade area.
- With the elimination of the duty drawback in 1994, Canadian assemblers who are outside the *Auto Pact* will be faced with paying higher costs for components imported from overseas than U.S. counterparts, who benefit from a lower MFN tariff. The current GATT round of multilateral trade negotiations provides an opportunity for the federal government, in consultation with labour and industry, to address this situation.

IN 1989, THE URBAN TRANSIT AND RAIL SECTOR EMPLOYED APPROXIMATELY 10 000 people and had \$1.5 billion in sales. However, in years where large urban transit contracts were delivered, total shipments have exceeded \$2 billion.

The sector is highly export oriented, with over 70 percent of urban transit and locomotive shipments destined for foreign countries, mainly the U.S. Virtually all Canadian urban transit and rail systems and vehicles are supplied by domestic sources. Imports, which come mainly from the U.S., consist of components such as engines, computers and other equipment not available from Canadian sources.

Structure

The urban transit and rail sector combines two distinct but related subsectors. The urban transit subsector includes manufacturers of urban and inter-city buses, guided-vehicle systems such as tramways, subway cars and passenger rail cars and their components. The rail subsector includes the manufacturers of freight cars, locomotives and their components.

Urban Transit Subsector

There are five bus manufacturers in Canada: two Canadian, two American and one Dutch. During the past four years, shipments have ranged from a low of \$230 million to a high of \$470 million. Work force strength during the same period fluctuated with shipments, from 2 000 to 3 000 workers.

Two major vehicle manufacturers, Bombardier Inc. and Urban Transportation Development Corporation Inc., dominate guided-vehicle system production. Both manufacturers have the capability to design complete systems and supply world markets. The cyclical demand for these systems causes both shipments and employment to vary greatly from year to year. Annual shipments over the last eight years have ranged from a low of \$230 million to a high of \$880 million. During the same period, work force strength varied from 4 000 to 7 000 workers.

Rail Subsector

The rail subsector consists of three freight car and two locomotive manufacturers, the largest being General Motors of Canada Limited, Diesel Division

(GM Diesel). In 1989, shipments in this subsector exceeded \$600 million and it employed over 3 000 people. Although Canadian, American and other markets for railway rolling stock are in decline, the 1988 decision by GM Diesel to consolidate its primary production in the U.S. into its facility in London, Ontario, has significantly increased Canadian shipments of locomotives.

Related Components

The urban transit and rail sector includes about 250 component suppliers that are mostly either small businesses or foreign-owned subsidiaries established specifically for the Canadian market. The dominant component producers are large, foreign-owned multinationals.

The sector's competitors are large, integrated and diversified multinational enterprises, such as Hitachi and Kawasaki of Japan, MAN and Siemens of Germany, ASEA Brown Boveri (ABB) of Sweden and Switzerland, and GEC Alsthom of France.

Competitive Performance

Over the last 15 years, Canadian urban transit and rail manufacturers have maintained their market share in stable or declining markets (buses and locomotives) and have made impressive gains in those markets that are expanding (guided urban vehicles and systems). The freight-car segment, which lost some of its market share in a declining market, is a small proportion of total shipments. Overall, the sector remains profitable and outperforms its American counterpart.

Urban Transit

The guided-vehicle-systems segment has grown dramatically since the mid 1970s. As Montreal and Toronto built and expanded their subways, Canadian industry developed the capability to supply the required equipment. Export sales began in the mid-1970s, and have grown steadily. Today, Canadian guided-vehicle manufacturers supply virtually all the

domestic market, and over one third of the American market. Bombardier Inc., which entered this market in 1976, has throughout the 1980s controlled more of the U.S. market than any other firm, largely by focusing on the replacement vehicle market.

Urban Transportation Development Corporation Inc. focused on marketing new systems in the U.S., where it was successful in selling light-rail transit vehicles, commuter rail vehicles, and its Advanced Light Rail Transit system (ALRT), the *Detroit People Mover*. The corporation has also been successful in marketing its innovative ALRT technology in Thailand. Competition for guided-vehicle systems manufacturing in U.S. markets comes mainly from European and Japanese companies. All of the U.S.-owned guided-vehicle-systems manufacturers of the 1970s have withdrawn from the industry, except for one vehicle refurbishing company that recently began new vehicle production.

The guided-vehicle-systems segment is one of the few secondary manufacturing areas dominated by Canadian-owned companies. These companies operate on a global basis, with some having subsidiaries in major markets. They control the domestic market and export a majority of their production. Their success has been achieved despite strong American non-tariff barriers such as the Buy America provisions of the *Surface Transportation Assistance Act* (STAA), significant foreign competition, and a market in which all major U.S. manufacturers withdrew from the manufacture of guided vehicle systems.

Canadian bus manufacturers are also successful, and now account for about one third of the North American market. During the last decade, the North American bus industry decreased in size. Sales of urban buses fell as transit operators purchased fewer vehicles than expected. The intercity bus market collapsed after the number of people using buses declined following air deregulation in the U.S. (and the resulting drop in air fares). North American bus manufacturers responded by rationalizing their activities. Despite these efforts, many are unprofitable, and several major American producers have ceased operations. Nevertheless, Canadian companies have maintained market share and most are developing new products for the future.

Rail

Since the early 1980s, Canadian freight car and locomotive producers have operated in a depressed North American market. With significant overcapacity triggered by deregulation, and more-effective utilization of rolling stock by North American railroads, the North American rail car industry has been forced to downsize significantly. Of the 23 American freight car producers in operation a decade ago, only 7 remain. During that same period, one in four Canadian car builders withdrew from the industry. Much of the Canadian freight-car segment remains uncompetitive with its U.S. counterparts, who have the advantage of economies of scale, unrestricted access to the larger American market, and lower material and labour costs.

The Canadian locomotive segment, on the other hand, has witnessed significant growth in recent years. There are now only two major locomotive manufacturers in North America: GM Diesel, which consolidated its world production of locomotives in London, Ontario in 1988, and General Electric, which in 1989 purchased the former MLW/Bombardier locomotive works in Montreal. Since 1988, Canadian production has quintupled, employment has doubled, and exports have risen to 70 percent of production.

Performance

Companies in the urban transit and rail sector sell largely to publicly owned or publicly funded organizations. Consequently, government procurement policies and practices directly affect the market for equipment. As a result, the most important factor influencing competitiveness is market access. Domestic procurement preferences often force companies to adopt practices that decrease productivity.

To be competitive in this sector, companies must have a reputation for quality and reliability, a proven technological capability to design and develop products and systems, and competitive prices. For large-scale capital projects, companies must be competent in project management, have the financial depth to participate in long-term commitments, and be able to provide favourable financing.

Market Access

In this industry, every country attempts to protect its domestic market while obtaining access to other markets. Non-tariff barriers, especially government procurement policies, are a significant barrier to Canadian exports to developed countries. These, together with strong indigenous industrial capacity, have virtually closed the European and Japanese markets to Canadian producers.

In the U.S., government procurement policies that apply to most purchases by transit authorities and municipalities have been a major barrier to producers outside the U.S. To access the U.S. federally funded public transit market, Canadian urban transit manufacturers must comply with the Buy America provisions, which require final assembly in the U.S. and a minimum American content of 60 percent. Manufacturers must also often meet state content requirements, as well as various regulations relating to minority-owned enterprises.

The Buy America provisions have a significant negative effect on Canada's productivity and competitiveness in this sector. The final-assembly provision forces Canadian vehicle manufacturers to set up costly, duplicate facilities in the U.S.; this increases costs for Canadian manufacturers, costs that their U.S.-based competitors do not incur. The U.S.-content provision forces component suppliers to locate in the U.S. rather than in Canada. Several Canadian component manufacturers have already relocated, and others are considering similar strategies.

In Canada, provincial governments have preferential procurement policies and practices, although they are generally less restrictive than the Buy America provisions. Ontario and Quebec traditionally buy from local sources. Other provinces may also give a preference to Canadian producers. While these practices have encouraged growth in the Canadian urban transit sector, they have also encouraged fragmentation and have restrained the achievement of economies of scale through rationalization. Canada has neither the explicit protectionist legislation of the Americans nor the more subtle protectionist measures of the Europeans and Japanese.

Technology

Canadian industry is competitive in terms of technology, and is, in some areas, a world leader. For example, UTDC Inc.'s ALRT system uses state-of-the-art linear induction motors and an innovative, fully automated command and control system. Both of these technologies were developed in Canada.

Other technologies pioneered by Canadian companies include a new streetcar for North American use (Canadian Light Rail Vehicle, or CLRV); special freight bogies (wheel assembly and undercarriage) for the rail industry; unique bi-level commuter cars that appear to have a good market potential in heavy suburban corridors; and the lightweight subway car used in Toronto. Bombardier was recently awarded a contract to develop, build and test an advanced-technology prototype subway train for the New York City Transit Authority.

In addition to in-house R&D, Canadian firms have acquired up-to-date product designs through licensing agreements and acquisitions. For example, Bombardier's licensing of French (for the Montreal Metro) and Japanese designs (for the New York City subway) was critical to the early success and subsequent growth of the company. Similarly, the acquisition of BN of Belgium and ANF-Industrie of France, and the acquisition of Transit America designs, Pullman designs, and Disney's Monorail and WEDWAY people-mover system, has enabled Bombardier to offer a complete line of transit equipment. Bombardier has also acquired the North American rights to the French TGV (high-speed rail) technology and was recently selected to supply a TGV system for Texas. Having access to this proven state-of-the-art technology allows Bombardier to offer leading-edge products in what is expected to become the most important rail market of the next 20 years. Yet, as opportunities to license or purchase designs become rare, and as the need to update the current inventory of designs becomes more critical, companies will have to intensify in-house R&D to assure their future competitiveness.

Canadian bus companies have R&D programs. They develop new designs and are leaders in some specialized areas. The Canadian industry offers a

complete range of products, including buses using alternate fuels and buses for the physically disabled.

Canada's major competitors in Europe and Japan, however, appear to be committing more resources to product development than their Canadian counterparts. Their large size and their access to significant markets give them a greater base to amortize large R&D expenditures. In addition, most international competitors are supported by government policies that favour domestic procurement and provide financial assistance for technology development. Because the development costs of these new technologies are underwritten, to a large degree, by a captive domestic market, their subsequent sale to other markets can be done much more competitively. Canadian industry is faced with a competitive disadvantage in this regard, because the Canadian market alone is too small to support a high level of technology development. There is a widespread belief that comparable levels of federal government support for R&D are not available.

Productivity

Throughout the last 15 years, Canadian companies have demonstrated their ability to compete internationally. The following factors are important determinants:

Labour: The majority of Canada's value added in the urban transit and rail sector is in vehicle assembly, which tends to be labour intensive. Accordingly, the industry could be vulnerable to free-market, low-wage competition, from countries such as Mexico. To date, the benefits of drawing upon a skilled and well-trained work force, a strong industrial infrastructure, and advanced manufacturing techniques have maintained Canada's advantage. There are indications, however, that there is a need for additional training programs to improve the sector's skills and knowledge base in order to maintain this advantage.

Economies of scale: Manufacturing economies of scale are of marginal importance to the urban transit subsector, since quantities are normally small and usually involve unique specifications, but they are of moderate importance to the rail subsector.

Component costs: Products such as diesel engines and transmissions for buses and locomotives, traction motors and catenary systems (overhead electrification systems), are not available from Canadian sources and must be obtained from American, European and Japanese sources. For large-scale capital projects, this can hamper the industry's ability to supply complete turnkey systems (such as when a key supplier is part of an opposing consortium) and can increase the complexity of financing the project.

Export Financing

Export financing is a key competitive factor in export markets. While Export Development Corporation financing can play a critical role in obtaining export orders in the face of international competition, concessional financing and subsidies by foreign governments make it difficult for Canadian companies to compete in many overseas markets. The industry also contends that Canadian banks do not support export financing, unlike their foreign counterparts.

Because mass-transit customers are purchasing more integrated systems, bidders must not only provide vehicles, but consultant studies and financial packages as well. Most mass-transit competitors offer comparable technology, so pricing and financing often become the deciding factors when selecting winning bids. Canadian companies often lack the financial depth of other competitors, especially when presenting bids for turnkey projects. For example, European and Japanese consortia frequently have combined-assets greater than those of the whole Canadian industry. These consortia can therefore arrange financing and large performance bonds much more easily than can a Canadian group.

Other Factors

A recent study by the Monitor Company on the competitiveness of the guided urban mass-transit segment identifies four determinants of national competitive advantage. These are: customers that demand a sophisticated quality product; competition on the home markets; access to competitive factors of production, such as skilled labour; and access to competitive supplier firms.

The study concludes that the sector rates well in all four categories. Canada and the U.S. are among the most demanding markets in the world; there is open competition, products from every manufacturer are available, and access to competitive factors of production is excellent. However, a lack of competition within Canada is noted.

In addition to the four determinants of national competitive advantage described earlier in this section, the Monitor Company considers the roles of chance and of government. It highlights how the failure of American manufacturers opened the U.S. market to Canadian manufacturers, and notes how governments, by offering concessional financing, play a crucial role in lowering the cost of systems.

The study concludes, overall, that the Canadian guided urban mass-transit segment is competitive. It also notes that should the U.S. government push to establish a domestic competitor for the U.S. market, or should the Canadian government reduce the availability of export financing, Canada's competitive advantage would be reduced.

Outlook for the 1990s

Because of increasing energy costs, growing environmental concerns, rising urban populations, and the need to alleviate ever-worsening traffic congestion, the market for guided urban transit and intercity passenger rail services will continue to expand. The international market for mass-transit rail vehicles and related systems is expected to be significant. The American Public Transit Association estimates that the U.S. transit market will exceed \$90 billion by 1997. In addition, the high-speed rail market in North America is estimated at \$200 billion. Individual contracts are often worth hundreds of millions of dollars.

The outlook for the bus and locomotive subsectors, however, is mixed. The demand for buses over the medium term is expected to increase, although severe production overcapacity in North America will mean continuing intense competition and probable restructuring of the North American bus industry. It is anticipated that Canadian bus manufacturers will remain competitive in the U.S. market. The demand

for locomotives will remain flat over the medium term, although Canadian manufacturers will continue to play a major role in both the new locomotive and locomotive rebuild markets.

In North America, Canada has led the way in establishing efficient public transportation systems in all of its major urban centres. While this has greatly contributed to the success of Canadian manufacturers, in the future there will be proportionately fewer new market opportunities in Canada than in the U.S. The gradual transition to mass transit in the U.S. is expected to create a huge and lucrative market for new light rail, commuter rail, and high-speed rail systems, in addition to the already large requirements for modernizing older subway systems. In the medium term, the U.S. will continue as Canada's most valuable market.

Canadian companies, because of their proven expertise, their operational efficiency, and their proximity to the U.S., are well positioned to expand their share of the North American market.

A Sectoral Agenda for International Competitiveness

The Canadian urban transit and rail sector is competitive in North America and, in some cases, internationally. To prosper and grow, the sector requires access to the U.S. and other markets. It must also continue to work with government to focus on competitiveness issues.

Access

- Buy America restrictions are an effective barrier to the U.S. market. Although the removal of these restrictions is being sought in the procurement negotiations of the current MTN round, government, in cooperation with industry, should continue seeking improved access to the U.S. market through the NAFTA negotiations, or through other mechanisms.
- Interprovincial barriers inhibit industrial rationalization and foster uneconomic practices. The federal and provincial governments should work with Canadian industry to reduce these barriers.

Financing

- Competitive financing often determines a company's level of success in foreign markets. Export financing is usually provided by governments, and often includes a subsidy element that distorts competition. Canada should pursue ways of reducing or eliminating such subsidization through multilateral mechanisms such as the GATT.

Productivity

- Canadian companies have developed and are implementing innovative technologies in their systems and products. In the past, a variety of means has been used to acquire such technology (e.g. joint ventures, licensing, acquisitions and in-house R&D). The industry should continue acquiring leading-edge technologies — and government should encourage these endeavours.

- High-speed rail is an opportunity to introduce new technology to North America through Canada. Though a decision on a Canadian HSR network is still pending, industry should prepare for the transfer of this technology to Canada through joint ventures and licences. The feasibility of establishing centres of excellence within Canadian universities, that focus on specific technologies, should be explored.
- Industry and labour can jointly identify the requirements for skills training, and then develop, together with the federal government, appropriate training programs.
- An industry association made up of large and small companies could act as a forum for information exchange, review and analysis of major issues.
- Industry and labour — working together — are in the best position to continually review operations and introduce appropriate measures to improve productivity.

THE TEXTILES SECTOR INCLUDES THE PRIMARY TEXTILES¹ AND TEXTILE PRODUCTS² subsectors. One of the oldest manufacturing industries in Canada, the textile industry accounts for 2.7 percent³ of Canada's GDP and 3.3 percent of all manufacturing employment.

Structure

The textile industry is composed of about 1 100 establishments employing 62 000 persons and has shipments of approximately \$6.9 billion.⁴ It supplies the needs of over 150 different industries in the Canadian economy. By far the largest customer is the apparel⁵ industry. Other major customer industries include the motor vehicle industry and the upholstered furniture industry.

A key factor in the performance and competitive prospects of the textile industry is the extreme variation in the needs of its customer industries. This variation places a special burden on the textile industry's ability to engage in long-term strategic corporate planning. To illustrate: most sectors of the apparel industry operate in a highly seasonal business environment, require a large range of fabric styles and patterns in small lots, and have short delivery lead-times. At the other end of the spectrum, the civil engineering construction industry requires a limited range of high-performance, consistent quality *geotextiles* produced to the most exacting specifications, and in large volumes.

The numerous markets served directly by the textile industry, or indirectly through its customer industries, can be grouped in three broad categories:

- household and institutional (subsequently referred to as household);
- apparel; and
- industrial and commercial (subsequently referred to as industrial).

¹ Primary textiles (SIC Major Group 18) consists of manufacturers of artificial fibres and filaments; yarns and fabrics; and in-house dyeing, printing and finishing processes integrated with yarn and fabric production.

² Textile products (SIC Major Group 19) consists of manufacturers of carpets and rugs, canvas goods, narrow fabrics, household products of textile materials, nonwoven fabrics, hygienic textile articles, tire cord fabrics, miscellaneous textile products, and the commission or contract textile dyers, printers and finishers. In most of the statistics in this paper, coated fabrics and linoleum floorcoverings (SIC 3993) are included with textile products.

It is estimated that the output of the textile industry is directed to these three markets in the following respective proportions: 45, 35 and 20 percent, calculated on a cumulative fibre-weight basis. Examples of products for the *household* market range from carpets for both residential and non-residential use to upholstery fabrics for household furniture. The *apparel* market, served through clothing manufacturers, encompasses the full range of garments for both civilian and military applications. Examples of products serving the *industrial* markets range from transportation fabrics for seat covers, headliners and other textile accessories through bandages, gauzes and dressings to felts used by the papermaking industry.

Exports account for about 13 percent of all Canadian textile shipments, and comprise mainly artificial fibres, filament yarns, carpets and coated fabrics destined for the U.S. and EC markets.

Domestic textile manufacturers supply about 66 percent of the Canadian market (on a value basis). Imports account for 34 percent of the market, and about 70 percent of these originate in developed countries, with the U.S. and the EC being major suppliers. Low-cost countries, however, are gradually increasing their share of total imports.

Textiles, comprising fibres, yarns, fabrics and a wide range of end products, are derived from *natural sources* (cotton, silk, flax and wool), *petrochemicals* (nylon and polyester) and *modified wood pulp* (rayon and acetate). The Canadian textile industry's access to raw materials is comparable with that of other industrialized countries. Fibres from natural sources,

³ Figures are based on 1989 data unless otherwise specified.

⁴ Not included in this definition is the motor-vehicle fabric accessories industry (SIC 3257), which had shipments exceeding \$1 billion in 1988 and employed about 7 000 persons in 26 establishments. This industry supplies the automotive industry with upholstery products and fabric trims.

⁵ The apparel industry (SIC Major Group 24) comprises some 2 600 establishments employing 115 000 persons, and has total shipments of \$6.6 billion.

for the most part not made in Canada, are purchased by Canadian textile companies in world fibre trading markets at competitive prices. By contrast, many fibres from the other sources (referred to as artificial), are made in Canada.

Capital intensity is high in the primary textiles subsector but varies widely within the textile products subsector. Carpets, rugs, primary textiles, non-woven fabrics, hygienic textile articles and tire cord fabrics are also capital intensive. While others, such as draperies and curtains or bedspreads and comforters, rely on the labour-intensive, cut-and-sew operations that are more akin to apparel manufacturing.

Concentration is notable in the primary textiles and some textile products areas (such as bedsheets and pillowcases, towels, and carpets and rugs) because of high entry barriers. However, due to intense import pressure, this concentration is not thought to have resulted in a lessening of competitive behaviour. The value of shipments of the top 7 percent of all textile firms (73 establishments, each with more than 200 workers) accounts for 50 percent of total industry output. Maintained by ease of entry, fragmentation is pervasive in some primary textiles areas (such as knitted fabrics) and in the textile products subsector, where small enterprises are predominant.

Foreign ownership accounts for 60 percent of primary textiles shipments and is particularly high in artificial fibres, reflecting the significant presence of foreign-based multinational enterprises in the Canadian petrochemical complex. It accounts for 30 percent of shipments in carpets and rugs, whereas, for most of the other areas, Canadian ownership is predominant. Canadian subsidiaries have generally been given extensive product development or marketing mandates and financial or technical support by their parent companies. It should also be noted that five major Canadian-owned textile firms have foreign operations that produce the equivalent of 18 percent of Canadian production. In fact, one Canadian-based multinational ranks among the 10 largest textile firms in North America, and is 20th in the world.

Vertical integration is significant in the primary textiles subsector, with several producers spinning their own yarn, and forming, dyeing and finishing fabrics. The degree of vertical integration varies considerably within the textile products subsector. Most of the carpet and rugs area has major producers

vertically integrated to include yarn, carpet and rug construction, and dyeing and finishing. However, except for towels and sheets, there is little upstream integration in other textile products areas. Also, the apparel industry, as well as other major users (furniture and automotive), are not vertically integrated into textiles, although in some cases (such as automotive), there are close links between primary textile suppliers and the industry. There is little downstream integration from primary textiles and textile products manufacturing through distribution (wholesaling and retailing) to the ultimate user.

In 1986 (the latest year for which figures are available), Quebec accounted for 51 percent of the value of all textile shipments, Ontario for 43 percent and the other provinces shared the remaining 6 percent of shipments. New Brunswick, Nova Scotia and British Columbia account for most of the textile production outside Quebec and Ontario. As a consequence of the historically important competitiveness variables — access to hydro-electric power, abundant water resources and a stable labour supply — most textile production still occurs in smaller, urban communities.

Performance

During the 1980s, the textile industry achieved several impressive results. Productivity exhibited better-than-average performance, and profitability and export orientation improved. The import share of the textile market was stable in the first half of the 1980s, but gained slowly in the second half.

In the post-war period, competition in both the textile and the apparel industries intensified worldwide. The developed countries responded to competitive pressure from low-cost countries by establishing the Short-Term Arrangement on Cotton Textiles (STA) in 1961 and the Long-Term Arrangement on Cotton Textiles (LTA) in 1962. By 1974, as competition from low-cost sources spread to wool and artificial textiles, the LTA was replaced by the Arrangement Regarding International Trade in Textiles (popularly known as the Multifibre Arrangement or MFA), a GATT-sanctioned departure from the basic GATT safeguard provisions. It allows member countries to negotiate bilateral export restraint agreements for textiles and apparel with low-cost suppliers in cases of market disruption. The objective is to control the growth rate of disruptive imports from specific

countries into domestic markets, while allowing the affected industries time to adjust.

The import restraints under the MFA have provided some breathing space for domestic textile manufacturers, especially through the broad coverage of apparel imports. However, low-cost competition has damaged the growth potential of the textile industry because imports of both textiles and apparel continue to grow at faster rates than the domestic market. Partially as a result of the MFA-mandated annual-import growth provisions included in restraint agreements, and the low coverage (11 percent of textile imports) provided in Canada's restraints on textiles, the *market share* (value basis) supplied by imports of textiles rose from 28 percent in 1973 to 34 percent in 1989. Low-cost countries accounted for approximately one third of these imports (11 percent of the total Canadian market). For apparel, it rose from 14 to 28 percent, helped by a growing number of domestic manufacturers who either replaced or supplemented domestic production with imported products. In the U.S., although total imports supply less than 10 percent of the textile market, about half of these imports come from low-cost sources. The U.S. quota regime for textiles is more comprehensive than Canada's.

Despite mounting import pressure, the textile industry continued to show real growth in output, although this growth rate did not match that of imports or domestic markets. Thus, textile *shipments* (constant dollars) increased at an average annual rate of 1.2 percent from 1973 to 1989, with faster growth occurring during the 1970s. In the same period, the domestic market for textiles grew at an average rate of 1.6 percent, with faster growth occurring during the 1980s. The moderate growth rate of this market reflects its maturity. It conceals, however, noticeable differences in the growth rates of its three broad components. For example, in terms of volume over the past decade or so, demand for *household* textiles is estimated to have grown at a yearly rate of 2 to 3 percent, *apparel* at 1.5 percent and *industrial* textiles (as the result of new end uses such as concrete reinforcement, ground stabilization and composite materials) at a yearly rate of 4 to 5 percent. For technical or engineered textiles used in high-performance applications, growth rates are estimated to exceed 10 percent.

Although starting from a small base, *exports* (constant dollars) increased at an average annual rate of 7.2 percent from 1973 to 1989. Annual growth was slower after 1981 than before, suggesting that export market development remains a challenge.

Another indicator of industry performance is *labour productivity* (GDP in constant dollars per person-hour worked). Between 1981 and 1988, the textile industry achieved productivity gains of 3.3 percent annually. Growth was even faster during the 1970s, at 5.6 percent between 1973 and 1981. In both periods, productivity growth performance far exceeded that of total manufacturing, which grew at 1.8 and 1.5 percent over the two respective periods. Consequently, by 1988, textile productivity levels were at 80 percent of the level for all manufacturing, compared with 55 percent in 1973.

As a result of its good productivity performance, the Canadian industry is at par with its U.S. counterpart. From 1975 to 1985, the Canadian industry restructured and modernized. It focused on achieving higher speeds and longer production runs, and reducing labour content. The industry in Canada moved faster than the U.S. to implement these changes because of its compactness and greater import pressures. Since 1985, however, the U.S. has been catching up.

In the 1980s, the after-tax *profit* on capital (return on investment) in the textile industry either matched or surpassed the all-manufacturing average. For example, in 1987 the textile industry reported a 10.9 percent return compared with 8 percent for all manufacturing. In the U.S. textile industry, from 1979 to 1985, profit (return) on equity was consistently lower than that for all manufacturing.

The textile industry, especially primary textiles, has a good *investment* record (reflecting its profitability). Over the five years ending in 1989, an average of almost 7 percent of its value of shipments (in constant dollars) was devoted to capital and repair expenditures for machinery, equipment and buildings, compared with an average of 9 percent for all manufacturing. However, some areas, for example homefurnishing textiles (excluding mass-produced products such as towels and bedsheets), likely had slower rates of adoption of advanced technology, pulling down the average for the industry.

In 1987 (the latest year for which comparable data are available), Canadian capital expenditures by the textile industry as a percent of shipments were 3.6 percent, while those of the U.S. industry were 3.1 percent. Although in both countries the percentages were higher for primary textiles than for textile products, the Canadian percentages were higher than those of the U.S.

Strengths and Weaknesses

The strengths of the textile industry are its capital intensiveness, its compactness, its sound productivity record and its up-to-date machinery. These strengths led to the good performance noted in the previous section. The industry's weaknesses are its lack of strategic positioning on domestic and world markets and, for the majority of small and medium-sized businesses making up the industry, its underdeveloped capabilities in forward planning, marketing, distribution and other non-production variables.

From the mid 1950s to the early 1980s, the industry concentrated its strategic planning on responding to the international challenge of low-cost imports in much the same way as its counterparts were doing in the U.S. and the EC. It reduced the high-cost labour content through capital investment in labour-saving technology, creating larger and more-specialized production units. In accomplishing this, the industry relied heavily on that segment of the domestic apparel industry that manufactured long-run standard apparel. This is the segment that is most vulnerable to low-cost imports and now faces increased competition from the U.S.

This situation began changing in the mid 1980s, when the marketplace called for greater design content, variety and service. These demands affected traditional markets such as apparel and household textiles, as well as the growing market for technical textiles. This necessitated a change in focus in the organization of production. From attempting to gain economies of scale through product specialization, the industry moved to emphasize flexible production units that could make a wider variety of products in small-sized runs, for which the technology was becoming more available. Throughout the latter part of the decade, the industry increased its investment in the equipment and expertise needed to service these demands.

The investments of the 1980s and the resulting improved ability to service clients was not fully appreciated by the apparel industry, due in part to poor communication. Manufacturers of fashion apparel complained of the textile industry's inability to service their needs. This might have been exacerbated by the relative absence of close links between the two industries, especially in the management of the production and merchandising cycle. Even with flexible production, it is unrealistic to expect the small Canadian textile industry to respond adequately to the full range of demands for yarn and fabric, or for exclusive products for certain sectors of the downstream apparel industry (women's sportswear). The disadvantages of gaps along the production chain (textile-apparel-retail) have been recognized and are being addressed with increasing contact and exchange of information. Moreover, with the FTA, the Canadian textile producers have a large enough market to broaden their product range and thereby better serve Canadian clients. As Canada-U.S. tariffs are reduced, apparel manufacturers will also have access to U.S. fabrics at lower landed costs.

Despite the adjustments to more flexible production, for most Canadian textile firms serving the domestic market, cost competitiveness in volume production of standard goods against large-scale producers in the U.S., the EC and Asia remains a challenge. Firms have increasingly resorted to producing specialty items in order to carve out domestic market niches for themselves.

The household industry still comprises small, fragmented, locally based firms with labour-intensive operations (except for carpets and some products such as bedsheets and towels, where some rationalization on a continental basis is well under way). Although these characteristics tend to be associated with underdeveloped marketing methods and distribution networks, they may reflect latent strengths in terms of responsiveness, service to clients and flexibility. They also have differing effects on upstream suppliers. Whereas the former group of producers (carpets and bedsheets) tends to have larger, integrated operations with a high degree of linkage vertically from fibres through to retail, the rest of the household industry tends to be widely dispersed geographically, requiring more frequent service with small, more-costly, shipments.

As the world's textile industry has become increasingly capital intensive, so has Canada's. *Technological progress* made by machinery manufacturers, mainly in the EC, the U.S. and Japan, is available to all users. The relative absence of textile machinery manufacturing in Canada may distance Canadian textile producers from participating in developing new technologies and, therefore, earliest-possible use. However, they are quick to adopt available new technologies and are increasingly engaging in applied product and process R&D. Computer Integrated Manufacturing (CIM) is contributing to higher quality and better client service, and there have been impressive advances in the production of technical or engineered textiles for industrial applications.

In the past, the lack of a sustained *commitment to export market development* across most of the industry has been a major impediment to international competitiveness. The Canadian industry's need for such a commitment is stronger than that of its U.S. and EC counterparts, which have significantly larger domestic markets and, consequently, greater opportunities to attain economies of scale and significant domestic market shares. The FTA is exposing the Canadian industry to the much larger U.S. market and to opportunities to produce and sell a wider variety, in smaller quantities, of specialty, differentiated and fashion-oriented goods. Canadian textile exports to the U.S. are indeed increasing, reflecting greater marketing efforts, identification of niche markets, and cross-border rationalization by international firms. What is not yet clear is how effective and widespread these responses are, especially over the long term, and the extent to which the industry is acting upon the trend to global production and distribution.

With regard to *human resources*, the textile industry is concerned with future availability of well-trained personnel, although this is not a major problem at present. The industry has difficulty attracting talented people due to the perception that wages are lower and career growth opportunities limited. In fact, the average textile industry wage belies the opportunities for well-educated, younger workers entering the industry. They can aspire to a salary in excess of the industry average because of superior advanced-technology and management skills.

Lack of a coordinated approach to professional textile training has also been a drawback in attracting good people to both the technical and managerial levels of the textile industry. In Canada there are few comprehensive university or other post-secondary textile programs. At the technical level, on-the-job training is used, but there are no formal apprenticeship programs, nor is there sufficient emphasis on multi-skills education. However, the Textile Technology Centre, in association with the CEGEP at St-Hyacinthe, opened in 1987 to provide quality service not only in industrial training, but also in testing and R&D. Furthermore, Mohawk College resumed part-time programs in the fall of 1990. In addition, a good deal of work is being done by industry, labour and government to improve human resources. Industry committees are identifying the needs of manufacturers for employee education, development and training, improved communication, and an enhanced image. This partnership initiative is the result of an industrial adjustment agreement between the Canadian Textile Labour-Management Committee of the Canadian Textiles Institute and Employment and Immigration Canada.

As a substantial user of chemicals, largely in dyestuffs, the textile industry is required to address significant *environmental protection* issues. In the past, Canadian textile manufacturers have abided by local and national requirements for environmental control. Currently, they are facing increasingly stringent standards under the *Canadian Environmental Protection Act* and its regulations governing the qualification of chemical substances. They are also facing possible fee increases for the certification of *trade secret* products with the Hazardous Materials Information Review Commission. The industry is concerned that the increased costs of meeting these new requirements may adversely affect the competitiveness of its products, compared with those of foreign competitors who are not subject to similar commitments. The positive side of this situation is that by being compelled to meet tough domestic environmental regulations, the industry may be better positioned to enter foreign markets where environmental regulations are now, or will be, equally stringent.

Outlook for the 1990s

Given the already high standard of living achieved by Canadians, long-term trends in consumer demand for household textiles and apparel will be driven primarily by the rate of household formation and the rate of population growth. The Canadian rate of household formation is projected to decline in the 1990s, while population is expected to rise at a slow rate. Future growth in disposable income per capita will probably have only a limited impact on domestic consumption. (Conventional economic theory suggests that beyond a certain level of income consumers direct a decreasing proportion of their discretionary incomes to certain commodities such as household furnishings and apparel.) The aging of the Canadian population is also expected to have a negative impact on these markets. This will not be felt until the late 1990s, when the large Baby Boom generation will enter the over-50 age group, which spends less on these items. Given these factors, it is possible that the markets for household textiles and apparel will show negligible growth in the 1990s, not exceeding 1 percent on average. Furthermore, when the effect of increasing imports of home furnishings, apparel, and fabrics for use in these products is factored in, it would be reasonable to expect that these markets will decline, although there should be growth potential in their upper segments.

In contrast to consumer demand for apparel and household textiles, market demand for industrial textiles tends to depend more on the level of overall economic activity and on the discovery of innovative applications for textile materials. Rapid growth is expected in this market because the drive to reduce manufacturing and operating costs enables textiles and textile-reinforced materials to broaden their share of components in automotive, aircraft and ground-based mass-transit system applications. Thus, while growth prospects for the textile industry for apparel and household textiles are limited in the domestic market, and future expansion will have to be export-market driven, there appears to be more

scope for expansion in the domestic and export markets for industrial textiles. Estimates of a 10 to 15 percent growth in the demand for more highly engineered textile constructions over the next several years are especially promising.

Much of future growth in world textile consumption is expected to come from maturing markets in developing countries. World fibre consumption to 2005 is expected to grow at an annual rate of 0.7 percent in developed countries and 2.2 percent in developing countries. At the same time, the trend toward trade liberalization, shown by the FTA and negotiation of a NAFTA, will further continental trade. Successful completion of the MTN (including the phase-out of the MFA⁶) will further the development of global trade, particularly trade in clothing and textiles. The dynamic world trading environment is expected to cause unprecedented changes. The potential for employment and market losses, particularly in traditional product lines, along with the accompanying uncertainty, will put a premium on long-term strategic planning and adaptability.

A Sectoral Agenda for International Competitiveness

The outlook for the 1990s provides a powerful stimulus for the textile industry to reconsider its attitudes and strategic approaches. The focus on the domestic market is increasingly less relevant and, despite slow growth in the U.S., the vast American market provides opportunities for significant export growth based on the displacement of existing high-cost suppliers. The textile industry realizes that a more outward-looking orientation will place it in a better position to capitalize on market opportunities here and abroad. Further, it recognizes that its future viability is founded largely on its ability to produce a high-quality, high-value-added product for specific markets, and on its production flexibility. However, it is likely that a majority of the small businesses operating in this industry lack the internal expertise or resources to analyze the factors that will affect

⁶ The integration of trade in textiles and clothing into the GATT will likely be achieved during the next 10 years. It will result from increased growth factors and the removal of particular items from coverage. Consequently, some areas may face integration into the GATT at an early stage in the transition period.

their competitive performance in the future. To transform this knowledge into winning business strategies, these firms will require outside assistance from consultants or other sources.

The adjustments required to move in the above directions will improve competitiveness, despite anticipated increases in the level of imports on the Canadian market. These adaptations must address a range of specific problems, since it will not be enough to focus on one area. Improving productivity will improve competitiveness, but sustained competitiveness is dependent upon a more broadly based approach that takes into account the principle of continuous improvement. In this context, it is proposed that the textile industry consider the following:

Marketing and Strategic Planning

- Reshape the business, where necessary, so that firms have the inherent flexibility in human resources, systems and technology to take advantage of market opportunities occurring anywhere in the world. For instance, the technical or engineered textiles market is one where manufacturers should be prepared to respond to opportunities, since its major competitiveness factors are knowledge, service and quality, rather than cost.
- Continue the shift toward market-driven versus production-driven manufacturing, by focusing on value-added products and innovative services. For example, where firms are small, fragmented and locally based, these characteristics, which are usually considered weaknesses, could be developed into strengths in terms of flexibility, quick response and superior service to clients.

Human Resource Development

- Maintain a commitment to ongoing training of management, design and production personnel in best practices and latest technologies in order to develop managers who can initiate and manage change, designers who are world-class, and multi-skilled workers who are able to operate a variety of equipment and learn quickly and efficiently.
- Promote, together with universities and colleges, the myriad career opportunities in the textile industry.

- Implement innovative labour-management working relationships, meaningful employee participation, and career development programs to improve the ability of the industry to attract qualified personnel and to secure commitment to quality and innovation.

Production Efficiency and Technology

- Continue to invest in suitable modern machinery and equipment that is linked to strategic corporate missions and business plans, ensuring that this investment is supported by operating, maintenance and repair skills. For example, advanced manufacturing technologies could be used to move toward leadership and competitiveness on the basis of mass production, or to provide competitive advantage in more flexible manufacturing systems geared to high-value-added products of consistent quality. In addition, in small firms, the appropriate combination of advanced production technology and modern management techniques could have greater benefits than in large firms.
- Increase performance in the management of technology (including information technology).
- Continue to rationalize fragmented sectors and production lines to improve scale of operations and to market unique products.

Linkages and Communication

- Increase inter-industry linkages among textile firms, their suppliers and their downstream clients, incorporating, where feasible, advanced technologies (electronic data interchange). This will more closely integrate market signals with planning and production cycles, while maintaining the distinct nature and corporate independence of all participants in the production-distribution chain.
- Strengthen inter-industry communication and cooperation that could lead to mutually beneficial joint pursuits in areas such as strategic market positioning, new product and process development, design, and marketing and promotion. By cultivating closer ties, textile producers, together with their suppliers and their clients, could address market demands and trends.

Research and Development, and Innovation

- Increase applied R&D, placing a greater emphasis on the creative adaptation of imported technologies and systems to pursue international market niches, and on the innovative development of specialty, differentiated and fashion-oriented goods.
- Explore opportunities to license proprietary innovation in products and processes. The view of textile manufacturers that their business is *textiles* needs to broaden to a larger vision that includes taking advantage of the benefits of their work in adapting or developing new machinery.

Environment

- Increase actions that protect the environment. The introduction of environmentally friendly thinking and equipment often leads to cost savings as processes are modified and products are recycled. In addition, an uncompromising commitment to the environment becomes part of the corporate culture, building employee loyalty and pride. Another benefit is that meeting tough environmental regulations may force a firm to innovate to the extent that it becomes a leader in its field.

The Facilitating Role of Governments

In addition to the actions that might be undertaken by the textile industry, governments have a role to play as facilitators. They can provide a more stable policy environment in which the Canadian textile industry can succeed in its drive to achieve inter-

national competitiveness and marketing excellence. Governments could also do a better job at cooperating and coordinating when working with the Canadian textile industry. Working together, governments and the textile industry can build a new policy framework incorporating the key elements of competitiveness: human resources, S&T, financing investment, competitive domestic markets, and trade. Comprehensive policies would cover:

- advice on, and the promotion of methods to achieve international competitiveness and thus secure international markets;
- fostering linkages among concerned industries and governments;
- orderly trade liberalization with a predictable set of rules governing trade in textiles and clothing;
- promotion of technology development and diffusion; and
- provision, with industry, of training and adjustment programs.

Given concerted action by business and governments, the Canadian textile industry can be expected to grow and become more internationally competitive. The success of the various industry groups will depend on how quickly they take action to move from standard to differentiated product status — and how well they maintain this competitive advantage. The prognosis is that this industry can make the transition.

THE CANADIAN FURNITURE MANUFACTURING SECTOR COMPRISES THREE subsectors: household furniture, office furniture, and other types of furniture. The other furniture subsector includes manufacturers of bed springs and mattresses; hotel, restaurant, casual and institutional furniture; picture and mirror frames; and furniture frames and components. The total industry accounts for annual factory shipments of \$4.5 billion and provides employment for about 54 000 people. Household furniture accounts for 43 percent of total shipments, office furniture for 24 percent, and other furniture for 33 percent.

Structure

Production facilities are concentrated in Ontario and Quebec, accounting for approximately 90 percent of total shipments. There has been some specialization, with Ontario being recognized for its office furniture, and Quebec for its wooden residential casegoods. Although Ontario accounts for the major portion of shipments in both categories, almost half of the household furniture manufacturing establishments are located in Quebec. However, there is also a concentration of plants in southern Manitoba, which includes Canada's largest furniture manufacturer (Palliser Furniture). The Alberta industry is emerging. There are few examples of either vertical, or horizontal integration within the sector.

In 1989, the household furniture subsector accounted for annual shipments worth more than \$2 billion, and employed an estimated 29 000 persons. In the same year the office furniture manufacturing industry shipped products of metal, wood and other materials worth almost \$1.2 billion dollars, and employed approximately 13 000 people. Collectively, the industries in the other furniture category are significant, representing employment for 12 000 and shipments of \$1.3 billion.

In 1989, the latest year for which 12-month trade and production data are available, the portions of Canadian shipments destined for export markets were 11 percent for household furniture, and 25 percent for office furniture; while 24 and 14 percent of the domestic market were supplied by imported household and office furniture, respectively. The U.S. is by far Canada's largest export market. It is also the largest supplier of furniture imported into Canada. Other main sources of imports are Europe and Asia. In countries with populations greater than Canada's,

large firms are generally of a greater scale than the large Canadian firms. For example, the leading office-furniture manufacturer in the world, Steelcase Inc., which is privately owned, employs 18 500 worldwide and has annual sales reportedly in excess of \$1.6 billion. This company employs more people and ships more products, than the entire Canadian office furniture industry. An increasing number of large U.S. office-furniture manufacturers have Canadian subsidiaries that produce for both the Canadian and export markets. Nonetheless, some of the more successful Canadian-owned companies have established plants in the U.S.

Performance

The growth and export performance of the furniture industry in the 1980s was surprisingly good, driven in part by the low value of the Canadian dollar relative to the U.S. dollar. As the decade drew to an end, however, the Canadian dollar appreciated, exposing weaknesses in the competitive ability of the sector.

Growth

Between 1980 and 1989, Canadian household-furniture subsector shipments experienced average annual real growth of approximately 1.5 percent, compared with average annual real growth of 8 percent in the office-furniture subsector. Real growth in the Canadian market during the same period was approximately 1.7 percent for household furniture, and 8.6 percent for office furniture. Currently, weak demand, typical in a recession, prevails in the Canadian economy. There has been an estimated 13 percent reduction in consumer demand for furniture in 1990 (compared with 1989).

Trends and cyclical variations in household-furniture subsector exports have paralleled those of the domestic market, although a loss of market share to imports has resulted in lower overall growth. The increase in imports has been offset by increases in exports. Companies in the subsector are facing significant cyclical pressures, and there have been industry-wide layoffs. A high percentage of these layoffs have been caused by plant closures and company failures. Whereas, during the 1982 recession, reductions were generally because of production cutbacks. Recognizable brand names that are disappearing from the marketplace, or whose rights are being transferred to other companies, include Bauhaus, Biltmore, Deilcraft and Gervais. The short-term pressures from the current recession may be accelerating adjustments and restructuring, but the long-term health of the industry depends upon its ability to compete in production costs, innovative design, and marketing.

Productivity

Over the past 10 years the furniture industry's contribution to Canada's GDP decreased to 0.35 percent, consistent with the decline in the total manufacturing industry. However, *furniture manufacturers have not kept pace with the overall manufacturing sector in the introduction of automated technologies* (as evidenced by the industry's consistent share of total manufacturing output), despite an increase in its employment share from 1.5 to 2.5 percent of total manufacturing employment.

The value added per production employee in the household-furniture subsector in 1988 was \$35 990; which, on a currency-adjusted basis, was 20 to 25 percent less than it was in the U.S. household-furniture subsector. In shipments per employee, a 17 percent margin *in favour of the U.S.* in 1982 increased to 27 percent by 1987. In the office-furniture subsector, this margin of advantage was 31 percent in 1982, increasing to 40 percent by 1987.

While office-furniture subsector employment and shipments per establishment, both in Canada and the U.S., show rising averages and follow similar patterns, the U.S. averages are substantially higher. Average shipments per establishment in Canada, in 1981 dollars, were \$3.1 million in 1982 and \$4.5 million

in 1987. In the U.S., average shipments per establishment (in current Canadian dollars), in 1987 were \$10.1 million, compared with \$6.1 million for Canadian office furniture manufacturers.

The Canadian household furniture subsector has regularly shown a profit, albeit a smaller one than its U.S. counterpart. Investment in the subsector has also been low, with capital expenditures averaging 1.6 percent of Canadian shipments, compared with 2.4 percent of U.S. shipments.

Trade

Imports from a broad range of international competitors, including the U.S., Europe and the emerging Asian economies, have been increasing substantially. Although part of the increase in imports from the U.S. and Europe might be attributed to the late-1980s appreciation in the Canadian dollar, the increase in imports from Asia suggests more fundamental competitive challenges.

In addition to the competition from imports of household furniture into Canada, the sector faces competition from other products and services. Personal expenditures on furniture since 1982 have ranged between 1.24 and 1.35 percent of total expenditures on consumer goods and services, compared with an average of 1.45 percent prior to 1982. While the reduction in percentage terms seems minimal, each 0.1 percent is close to \$400 million, or about 20 percent of industry output.

Exports of Canadian household furniture increased twelvefold between 1973 and 1990, to \$270 million. Although initial gains followed improved productivity and a favourable exchange rate, continued growth in exports has been hampered recently by the strength of the Canadian dollar and unsatisfactory productivity performance. Exports to the U.S. during the past six years have been more than 95 percent of total exports. In absolute terms, exports have been greatest when the value of the Canadian dollar has been lowest.

Shipments of office furniture by Canadian manufacturers totalled \$124 million in 1973, and increased steadily to \$1.2 billion in 1990. Little fluctuation was experienced, notwithstanding the 1982-83 period of reduced economic activity. Canadian exports of office furniture, which stood at

only \$18 million in 1973, also increased substantially during the period, and by 1986 reached \$361 million. This represented an increase from 15 percent of shipments to 38 percent. Since then, exports have declined to \$319 million in 1989 (or 25 percent of shipments), attributable to a less favourable exchange rate, a shrinking North American market, and a drop in competitiveness with U.S. manufacturers. Office furniture exports to the U.S. have remained between 93 and 97 percent of total exports.

Strengths and Weaknesses

Numerous studies have been made of the Canadian furniture industry since 1988, sponsored by the federal government (Price Waterhouse), the Canadian Council of Furniture Manufacturers (Samson Belair), and by industry task forces in Ontario, Quebec and western Canada. The studies identify several major impediments to the international competitiveness of the sector, including deficiencies in marketing, productivity levels, modernization, skills training, and financing availability. Many of these problems, and the difficulties in implementing solutions, are related to the fragmented nature of the industry.

Using three separate regional initiatives, the industry is considering various means of rationalization. The experience of the past two years has highlighted that the Canadian industry is at a disadvantage when competing head to head with the U.S. industry. Operating costs are higher (15 to 20 percent), transportation rates and inefficiencies are still a problem, and plants are generally smaller. In addition, U.S. plants tend to benefit from more-modern machinery and equipment. The net effect is that American companies have attained greater productivity than their Canadian counterparts.

In general, manufacturers have increased productivity by standardizing and rationalizing production, thereby increasing production runs. On this basis, the investment in costly, high-capacity modern machines is justified. The Canadian industry's efforts to modernize, however, have been hampered by high interest rates and, in many cases, difficulties in obtaining financing. Between 1982 and 1987, the ratio of the prime rate charged by U.S. banks to the

rates charged by Canadian banks on prime business loans dropped from 0.92 to 0.86, indicating an increasingly more favourable climate for investment within the U.S. In recent months (mid 1991), the differential between the rates in these two countries, as well as the absolute level of Canadian interest rates, have declined substantially. Nonetheless, according to sources within the industry, the numerous state and municipal incentives in the area of tax concessions, serviced facilities, and special financing arrangements, have enticed several established Canadian companies to open plants in the U.S., and to close or reduce their scale of operations in this country.

Opportunities for survival and success do exist. Aided by a similarity of consumer preferences, and the proximity of major markets, some Canadian-based household-furniture manufacturers have developed a market for their products in the U.S. In most cases, they have succeeded either with products targeted to one market segment, where competitiveness is achieved by product specialization in a style or design, or with products in the high-priced ranges, where design and quality are more important than price. Already, some retailers are giving preference to manufacturers that have a recognized quality-assurance program.

Although design successes are claimed by some companies, the Canadian industry acknowledges a serious shortfall in its innovative design capabilities. This shortfall must be addressed if the sector is to increase its share of world markets.

Despite their unsatisfactory productivity performance, Canadian office-furniture manufacturers have remained the dominant force in their domestic market, and have achieved success in the U.S. market. This success has been attributed to flexible design specifications, and skilled exploitation of high-priced niche markets. While some companies are selling in offshore markets, the industry has not pursued overseas opportunities because the U.S. still offers scope for further expansion.

Continued success in exploiting these opportunities depends upon industry's ability to cope with the managerial and technological demands of modernization and rationalization. To date, dedicated skills training for the furniture-manufacturing industries has been

restricted to Conestoga College of Applied Arts and Technology in Kitchener, Ontario, and École québécoise du meuble et du bois ouvré in Victoriaville, Quebec. Although both institutions have updated their equipment in recent years, they find it increasingly difficult to keep pace with the rapid evolution of technology in the industry. In addition, the increased management challenges associated with globalization of markets are not being fully addressed by academia.

Outlook for the 1990s

Forecasts for the period 1986 to 2011 predict a reduction in the growth of the number of families to 0.7 percent per year; down from 2.5 percent in 1976 (annual average for the 1971-76 period), and 1.3 percent in 1986 (annual average for the 1981-1986 period). This, coupled with modest growth projections for real disposable income, will have a moderating affect on the growth of household-furniture sales in Canada.

While the Canadian household-furniture subsector is generally not cost-competitive with U.S. and foreign industries in the low to medium-priced categories, some manufacturers will continue exploiting market niches in the U.S. by specializing in products targeted at market segments, or by focusing on products in the high-priced ranges, where design and quality are more important than price.

To meet the increased demands of consumers for better service and quality, retailers will be expecting improved service from their suppliers. The demand for quality-assured products will likely continue to grow over the next decade.

The growth rate of the office-furniture subsector is expected to be lower than in recent years, due in part to reductions in construction starts for commercial, institutional and industrial buildings, in both the Canadian and the U.S. markets. However, growth in the white-collar and service-producing sectors will likely continue through the early 1990s, and should result in a continuing strong demand for office-furniture products and services.

Canada's office-furniture industry continues to be less cost-competitive than the U.S. industry. The overwhelming size of that country's largest office-furniture plants, and the massive U.S. market, have offered the U.S. industry greater opportunity to increase market share and take advantage of economies of scale. A similar opportunity has been created for Canadian manufacturers with the advent of the FTA.

Implementation of the FTA has already significantly increased competition in the Canadian market. This increased competition, along with that from overseas suppliers, may be accompanied by further rationalization in the Canadian industry. It will require that Canadian manufacturers improve productivity and competitiveness through strategic alliances, product specialization, development of new markets, undertaking of mergers and acquisitions, and use of more-efficient manufacturing methods. The integration of more-advanced manufacturing technologies will produce increased demand for a dynamic training environment that is geared to keep up with changes in machinery and equipment.

In Canada and the U.S., Asian and European producers are competitive in products in the low to medium-priced ranges that are suitable for the ready-to-assemble and knock-down market segment. The emergence of Mexico as an important participant in North American markets will increase the competition faced by the Canadian industry, in both its domestic and its main export markets for low-priced and standardized products. Over the next decade, the Canadian industry will have to seriously review its marketing practices, and strive to increase its share of the global market.

Western European producers are particularly competitive in small, high-priced market segments featuring products with unique modern designs. With the gradual reduction of Canadian tariffs under various GATT agreements, the Canadian furniture industry has become more exposed to international competition. Rapid growth in imports from the Far East during the past few years indicates competitive pressures coming in the medium to long term.

A Sectoral Agenda for International Competitiveness

The global marketplace is a reality of the 1990s, and industry must address it directly with upgraded manufacturing facilities, skilled labour, quality assurance, innovative products, and new marketing strategies.

In order to meet the growing competition, and take advantage of new opportunities on a global scale, the Canadian furniture industry will have to work together with government. Individual and joint efforts will have to be targeted at overcoming all barriers to the long-term competitiveness of the sector. Strategic planning is essential to the industry's survival.

The priorities for such a plan should concentrate on issues such as:

- marketing and design;
- productivity, operating costs, modernization and financing; and
- skills training.

Marketing and Design

The primary responsibility of overcoming barriers in the areas of marketing and design lies with the industry. The government, however, does have a role to play as a facilitator. Specific actions need to be taken if the industry is to defend against further inroads by foreign suppliers. New marketing strategies need to be developed, and consumer awareness campaigns in the domestic market will become increasingly important. In order to maintain their share of the market, it may be necessary for Canadian companies to promote their brand names more vigorously at the consumer level. Some form of vertical integration to the retail level (either directly or through strategic alliances) will afford manufacturers greater control over their destiny.

Quality, as well, will be important in securing future market stability. The federal government can assist in the establishment, by industry, of quality-assurance programs based on international performance standards. While marketing initiatives in Europe and Japan might be considered (by larger companies and specialty product manufacturers), expanded market opportunities under the FTA should be pursued first. Both the federal and the

provincial governments offer programs that support export market development. If the industry is to maximize on new market niches, however, innovative design skills must be developed. Increased exports, because of economies of scale, will lead to lower unit production costs, and, ultimately, greater competitiveness.

Productivity, Operating Costs, Modernization and Financing

This will require commitment on the part of the industry. Initially, strategic alliances may be the most viable means of overcoming the lack of economies of scale suffered by most of the industry. Additional investment in new technologies and manufacturing systems however, will be an important factor in improving the competitiveness of the sector. Modernization should be addressed rationally and without undue delay. Independent studies of manufacturing facilities can identify operational weaknesses, and make recommendations for cost-effective remedies that improve productivity levels and reduce operating costs.

In all instances the initiative clearly lies with the industry, but government assistance is available through a range of specially designed programs such as AMTAP, offered by ISTC. These programs may be utilized not only to analyze efficiency internally, but to monitor progress in the implementation of productivity improvement and modernization action plans, and to compare an organization's competitiveness with domestic and international competitors. To ensure the availability of the financing needed to upgrade the sector, it may be necessary to initiate a national awareness campaign to regain the confidence of Canada's financial institutions. Such a campaign will require the unified efforts of the industry.

Skills Training

The industry has identified skills training as being critical to its long-term survival. In the short term, skills training will continue to be addressed through Employment and Immigration Canada's Industrial Adjustment Service, by means of joint industry-government committees. In the long term, efforts should be made to enhance existing training facilities

through strategic alliances with machinery manufacturers, and to upgrade the skills of teaching staff through international exchanges of instructors. Also needed are management development, apprenticeship, and engineering programs and facilities similar to those already available to the furniture industry in Europe. The success of any training and education initiative however, depends on the level of industry (management) commitment, involvement and investment. In addition to addressing the situation in formal educational institutions, a planned technology-transfer initiative could be launched to increase the level of technology awareness in the industry. Action on these issues will be the shared responsibility of industry, government and the academic community.

Relative to the U.S., Canada is a country with generally high production and distribution costs (because of climate and geography) and generally high taxation levels (because of greater investment in social and physical infrastructure). Canadian companies in the furniture sector, not unlike their counterparts in other industries, will have to excel in areas other than strict production efficiency to offset inherent cost disadvantages. Emphasis therefore, should be placed on upgrading innovative design capabilities, improving marketing expertise, and producing quality-assured products.

THE COMMERCIAL SERVICES SECTOR, A COLLECTION OF HIGHLY DIVERSE INDUSTRIES, represents about two thirds of Canada's GDP and contributes to the competitiveness of the entire economy. In fact, services are critical inputs to all other sectors of Canada's economy, are essential consumer products and generate significant wealth in Canada through growing service exports.

Structure

The service sector is generally defined to include utilities, transportation, communications, wholesale and retail trade, finance, insurance and real estate, business services, personal and community services industries, and government services. Put another way, services include all sectors of the economy except agricultural, resource processing and extraction, manufacturing and construction industries.

Services can be classified into three subsectors: *consumer services*, *producer services*, (which taken together are referred to as the commercial services) and *government services*. This analysis concentrates for the most part on the role of commercial services in the economy, and the issues they face in being internationally competitive.

Analysis of the service sector is hampered by an inadequate statistical base and by the fact that the information that is available often does not reflect satisfactorily the existing situation in the industry. Further, given the diversity of services, it is difficult to generalize about the entire sector. As a result, a rigorous statistical analysis, such as that possible for a goods sector, is not feasible. This analysis is based mainly on the research and consultations about services that have been carried out over the last few years by ISTC and others.

Services in the Economy

The economies of most advanced industrialized nations have experienced a phenomenally rapid growth in their service industries in the post-war period. In the U.S., services now account for approximately 68 percent of the GDP and 74 percent of employment. In the U.K., 62 percent of the GDP was contributed by the service sector in 1987, in France, 65 percent, and in Germany, 58 percent. The Canadian economy has undergone similar

changes. In the 1980s, employment in the service sector increased by almost 1.9 million, while in the goods-producing sector, employment declined marginally. Consequently, the share of total employment in Canada accounted for by the service sector increased from 68.5 percent in 1980 to 71 percent in 1990. The service sector's share of the GDP also increased sharply, rising from about one half to about two thirds of the total GDP in the post-war period. In 1990, the value of services produced in Canada was more than twice the value of goods.

The following sections review, in turn, the three subsectors of the service economy: producer services, consumer services, and government services.

Producer Services

Service sector growth in the post-war period has been fuelled almost exclusively by business demands for new and improved services — the producer services. In fact, during the last 25 years the share of producer services in real (1981 dollars) GDP has risen by 20 percent, so that producer services now represent almost one half of services output, with consumer and government services representing one quarter each. (The consumer services share of real GDP has not changed significantly over the last 25 years.)

Producer services comprise services sold to Canadian firms and businesses, including:

- accounting;
- architectural services;
- telecommunications services;
- computer services;
- consulting engineering;
- distribution (retail and wholesale) services;
- financial services;
- industrial design;
- legal services;
- management consulting;
- maintenance and repair services;

- personnel services;
- scientific services;
- security services;
- training services; and
- transportation services.

All of these producer services contribute to the effectiveness and efficiency of all industries in Canada; they are critical to Canadian industrial competitiveness and are highly tradeable. For example, the growing importance of telecommunications to the way business is conducted has been paralleled by real growth in the telecommunications services industry of 7.7 percent annually from 1971 to 1990. The use of producer services such as design and engineering, computerization and general business services in the production of goods, has increased in importance. The growing inseparability of the production and sale of products in combination with a service (e.g. turn key operations, systems maintenance and product information hotlines) has led some firms to adopt a strategy of solution selling as an added competitive advantage in an increasingly competitive marketplace. On-the-job training also has become more important to maintain a competitive edge and keep workers qualified for more complex tasks. The magnitude of these trends is reflected in the fact that the use of services in the production of goods has grown faster than real GDP in the Canadian economy. This appears to have been the case in all advanced economies.

This relative growth of the producer-services sector in modern economies can be explained by an historical process of *capital deepening* — a process where human capital, knowledge, physical capital and land, combine to produce economic growth and development. Increased specialization and the growing use of intermediate inputs in the production of goods and services have also played a role in the growth of the producer-services sector.

Consumer Services

Consumer services were at one time considered to be economically unproductive. The critical role these services play in the economy, and in meeting the needs of Canadians is now evident.

Consumer services industries include the following:

- accommodation and food services;
- amusement and recreation services;

- telecommunications services;
- distribution (retail and wholesale) services;
- financial services;
- laundries and cleaners;
- motion picture and video services;
- photographers;
- private health and education services; and
- transportation services.

The consumer-services sector, which has experienced growth in line with the economy as a whole (thus enabling it to maintain its share of GDP), has been influenced by the increasing participation of women in the labour force. This has had the effect of not only raising the income level of households, but of increasing the demand for consumer services that had previously been supplied in the home. As real disposable incomes have risen and the relative prices of services declined, Canadians have purchased more household and personal services (e.g. daycare, and laundry and cleaning services), visited restaurants more often and used telecommunications and financial services more frequently. Leisure time also has been on the rise in this period, resulting in a greater demand for recreational, personal, travel, accommodation and similar services.

Government Services

Governments play an important role as suppliers of services in the Canadian economy. Three broad categories of government services can be identified: those of a public nature (e.g. social and structural infrastructure, including education, defence, pollution control, and highways and public transit), those undertaken for the welfare of all members of the country (e.g. health services and unemployment insurance) and those that reduce economic instability (e.g. the Bank of Canada and fiscal responsibilities). Some of these government services are also producer services offered to businesses (e.g. training services, information services, export financing, and regional industrial development programs).

The share of government services (not including transfer payments) in the GDP reached a peak in 1982, but by 1989 the government services share was below the 1961 level. In 1989 government services accounted for 16.4 percent of the GDP, falling from 17.6 percent in 1961. Despite this decline in their share of the GDP, government services have

increased in absolute terms. Government services to Canadians, such as health, education, justice and administration, have risen to keep pace with the population growth over the past two decades (1.1 percent per annum). As well, government spending on infrastructure, such as roads, highways and airports increased to service a growing economy. However in recent years, significant pressure to reduce government spending has fallen heavily on government services, as opposed to transfer payments related to social programs. If this trend continues, the real share of government services in the economy will continue to decline compared to other sectors.

Industrial Linkages

"We found that the goods industries are the source of a substantial part of the demand for the output of the service industries, and likewise, the service industries are a source of a substantial part of the inputs required by goods producers. It is this mutual dependency, in conjunction with differences in productivity levels across the two sectors, that explains why the shift to services has occurred."

Economic Council of Canada, 1991, Employment in the Service Economy

The data leave little doubt of the increasing reliance on services in all sectors of the economy. In 1987, goods industries consumed over 30 percent of all services, and close to half of the output of the Canadian producer services industries. From 1971 to 1987, the consumption of producer services grew at an average annual rate of 5.2 percent. It has been further estimated that every dollar of goods exported from Canada contains 39 cents worth of producer services output. The growing linkages between goods and services in the Canadian economy, and the extraordinary dynamics of the service industries, are contributing to a marked blurring of the traditional distinctions between goods and services. While many service companies supply other service firms and goods-producing firms, some goods producers are recognizing that a competitive advantage through added service value can be obtained. For example, a new automobile includes not just the car, but design,

engineering, sales and after-sales service. As a result, a world-class service sector, one that is cost competitive and that can assist other firms to improve their cost position, is vital for Canada.

Performance

"The (U.S.) Commerce Department figures that legal services now generate more value added — an industry's gross receipts, minus purchases made by that industry from other sectors — than the country's steel, textile or even automobile industries generate."

Forbes, February 4, 1991

Summarizing the structure and performance of the service sector is difficult, more so because of its great diversity. Many service industries in Canada are fragmented, with the highest degree of concentration occurring in the transportation, telecommunications and utilities sectors, and parts of the finance, insurance and real estate sectors. Generally, within each industry there is no dominant player; technological sophistication varies widely and the nature of the service may not be noticeably different (i.e. little differentiation of services exists). More often than not, firms can freely enter the industry, economies of scale in production are absent, and market demand is diverse. In addition, regulation of one form or another may be present (e.g. engineers or other professionals, transportation, telecommunications, utilities and financial services). Most service industries are highly competitive, entrepreneurial, and human resource intensive. This is the case even in highly concentrated sectors (e.g. banking and insurance), and where firms are very capital intensive (e.g. telecommunications, gas and electric power distribution).

Service industries experienced sustained growth through the 1970s and 1980s, and although growth slowed in the 1980s to 3.8 percent annually (from 5.4 percent in the 1970s), the service sector continued to outpace the total economy (which grew by 2.9 percent annually in the 1980s) and the manufacturing sector (which grew by 1.8 percent annually in the 1980s).

CANADIAN INDUSTRIES — SECTORAL PERFORMANCE

	GDP		EMPLOYMENT	
	1990, billions of 1986 dollars	Growth percent 1981-90	1990 (000s)	Growth percent 1981-90
Transportation, Telecommunications and Utilities	57.1	3.7	951	0.5
Wholesale and Retail Trade	58.4	3.6	2 246	2.0
Finance, Insurance and Real Estate	80.2	3.6	755	2.7
Community, Business and Personal	64.1	3.8	4 299	3.1
Manufacturing	91.3	1.8	2 001	-0.7

In 1987, service industries constituted 68 percent of non-financial Canadian corporations, and contributed 54 percent of the aggregate sales of these corporations and 44 percent of profits. Over a 20-year period (1965 to 1985) the service share of (non-financial corporate) profits rose by almost 10 percent, while the manufacturing share declined by 6.5 percent. However, due to the diversity of industries and the range of competitive environments, the financial performance of service firms vary widely.

To compare and assess the financial performance of the service sector, it must first be noted that the asset and equity positions of service firms can be significantly different from those in the manufacturing sector (Except for the transportation, telecommunications and utilities sectors and the financial sector, service firms tend to have relatively few assets and require smaller equity investments.) In comparison to the manufacturing sector, whose return on equity (ROE = net income/total equity) was 17.3 percent and whose return on assets (ROA = net income/total assets) was 4.7 percent in 1989, the financial performance of the service sector compared favourably. Some industries such as professional services (e.g. physicians, and engineering and scientific services) and advertising services had much higher ROEs and ROAs than manufacturing.

Conversely, the financial performance of the retail industry has been low, with a few noticeable exceptions, such as drug stores, which have had impressive financial ratios.

FINANCIAL PERFORMANCE (1990) — SELECT SERVICE INDUSTRIES

	Return on Assets (percent)	Return on Equity (percent)
Retail		
Women's Clothing	1.61	4.10
Hardware Stores	4.61	10.16
Drug Stores	10.16	21.95
Real Estate Developers	5.58	18.56
Offices of Physicians	36.68	76.25
Motion Picture Theatres	4.04	14.15
Engineering and Scientific Services	13.05	38.51
Advertising Services	15.98	69.87
Hotels, Restaurants and Taverns	3.05	8.41
Manufacturing	4.70	17.30

Productivity Comparisons

The important issues for productivity in the service sector are little different from those in the goods sector. However, the measurement of productivity in the service sector suffers not only from the quality and quantity of the data, but also from an incomplete understanding of services production and of the interdependency with goods production in the economy. How do we measure the real output of a lawyer or doctor, a bank, a management firm or a business that provides advertising services?

The current state of our knowledge suggests that service sector labour productivity growth, relative to the Canadian manufacturing sector, has been mixed. Labour productivity growth since 1975 (GDP per actual hours worked) has been superior to manufacturing in two subsectors: transportation, telecommunications and utilities; and retail and wholesale trade. In the finance, insurance and real estate, and community, business and personal services subsector, labour productivity growth has not been quite as high.

While the reasons for this performance are diverse and not understood completely, some consolation may be drawn from international comparisons. For example, in the U.S., the growth rate of GDP per employee in services was lower than in Canada in each of the four service groups between 1980 and 1988. In this period, aggregate service sector labour productivity in the U.S. grew at an average annual

rate of 0.4 percent while in Canada it was 1.4 percent. Metered against the 11 members of the OECD, Canada's service sector has turned in mixed performances in terms of labour productivity levels and growth rates over the 1981 to 1987 period. For example, in a finance, insurance, real estate and business services grouping, Canada's level of labour productivity stood third to Japan and Germany, fourth in the transportation, telecommunications and utilities group, seventh in the trade group, but last in the community, social and personal services group.

**CANADA — U.S. SERVICE SECTORS
LABOUR PRODUCTIVITY COMPARISONS**
(average annual growth, percent)

	CANADA		U.S.	
	1971- 1988	1980- 1988	1971- 1988	1980- 1988
Service Sector (Total)	1.52	1.40	0.23	0.42
Transportation, Communications and Utilities	3.45	3.62	2.41	2.68
Wholesale and Retail Trade	1.14	2.25	0.55	1.42
Finance, Insurance and Real Estate	1.07	0.60	-0.11	-0.36
Community, Business and Personal Services	1.72	1.06	-0.39	-0.39

The mixed service-sector labour-productivity performance in Canada appears to be the result of numerous factors. The highly fragmented industrial structure of many service industries, the rate of adoption of new technologies, poor management and labour-force skills, and the constraints of obtaining both capital and labour resources are only a few of the possible reasons. In the 1980s, the actual hours worked by service-sector employees rose more slowly than the numbers of employees in each sector, while the proportion of part-time workers in service producing industries continued to rise. At the same time, investments in new technologies, which had been growing rapidly in the service industries, thereby introducing technological innovation, were not maintained. These facts suggest that some productivity gains may be obtained in the service sector by more efficient organization, use and management of resources.

The most important determinants of service sector productivity appear to be human and information capital. Economies of scale and scope, and the gains due to organizational change, have had only limited impact in the service sector, mostly in the regulated sectors (i.e. banking, transportation, telecommunications and utilities). There is some evidence to suggest that returns to scale in advertising may be obtainable in chain-store retailing. Research also suggests that some scale benefits may exist in the real-estate brokerage industry. While the returns to specialization have been suggested as being important in the consulting engineering industry, the majority of service industries have been found to exhibit constant returns. Only in one subsector, finance, insurance and real estate, did capital substitution for labour exceed the rate in manufacturing, thus contributing to productivity gains.

Trade in Services

World trade in services, the bulk of which occurs among OECD countries, was estimated at over \$600 billion in 1989, growing at an average annual rate of 8 percent in the decade between 1975 and 1985. While more OECD countries, including Germany and Japan, recorded trade deficits in services than trade surpluses, Canada possesses the largest service-trade deficit, despite having many strong international sectors. In an environment that has become increasingly more competitive, some Canadian firms have succeeded in carving out a niche in international markets. Nevertheless, Canada places only two service firms in the top 100 international service firms — the Royal Bank of Canada and Bell Canada.

Over the 1980s, Canada's deficit in services trade grew at an annual rate of 9.3 percent and stood at \$7.2 billion in 1989 (on a current account basis). However, there have been significant shifts in the composition of the services trade, and the aggregate services trade statistics (some of which include goods) mask the potential strengths in Canada's service export economy. Traditionally, personal travel abroad, and net investment income of foreigners have accounted for the lion's share of the services trade deficit, which was exacerbated by government trade in services. Further, Canada records large deficits for royalty payments and trademarks (that is payments for intellectual property and for management and administration services), which are largely payments

by Canadian subsidiaries of multinational corporations for services being purchased from their foreign parent or affiliate. While such service imports represent an important source of expertise and human capital for the economy, they also significantly affect trade patterns of services.

Canada's exports of transportation services have generally exceeded imports, and business and professional services have become important export earners for Canada. Business services accounted for 19.1 percent of Canadian services exports in 1990, up significantly from 9.8 percent in 1961. Similarly, imports of business services totalled 15.9 percent of service imports in 1990 versus 51.3 percent in 1961, demonstrating the shift in Canada's services trade and the increasing globalization of services. Over the 1961 to 1990 period, international business services exports increased at an average rate of 5.7 percent, compared with 5 percent for business services imports.

BUSINESS SERVICES BALANCE OF TRADE — SELECTED YEARS

	1969	1981	1988
Consulting and			
Other Professional	-56	173	185
Transportation Related	18	-171	-89
Management and Administrative	-72	-519	-674
Research and Development	-40	-199	-63
Commission	46	86	203
Royalties, Patents			
and Trademarks	-132	-655	-1 171
Film and Broadcasting	-32	-138	-168
Advertising and Promotion	-18	16	-74
Insurance	-30	-113	-722
Other Financial	N/A	-276	-307
Computer	N/A	-21	82
Equipment Rental	-8	-197	-61
Franchise and Similar Rights	N/A	-8	-33
Communications	-8	-56	-14
Refining and Processing	N/A	N/A	102
Tooling and Other			
Automotive Charges	-72	3	33
Other	-94	-203	-483
Total	-517	-2 277	-3 256

With respect to individual subsectors, Canada tends to run a surplus in the balance of payments for such items as computer services, resource-based services, consulting and other professional services, broker and agent commissions, as well as communications. Traditionally, consulting engineers and purveyors of financial and professional business services have been active in the international marketplace. Consulting engineers have developed a significant presence in international markets and continue to develop new markets, including the business generated by international financial institutions (e.g. the World Bank). The Canadian industry ranks among the most developed in the world. In 1989, consulting engineers earned over \$590 million on projects in foreign countries, thus generating a significant trade surplus for Canada in this area. Canadian financial services firms have also had a visible presence in the U.S. and the U.K., and have positioned themselves in the major capital market centres around the world.

Canada's major trading partner in services is the U.S., the world leader in services trade, followed by the U.K. and France. The U.S. trade surplus has declined in recent years while both France and the U.K. have improved their service trade positions. Japan and Germany, as mentioned earlier, follow Canada in having large trading deficits. However, unlike Canada, both Japan and Germany have been reducing the overall level of their services trading deficits.

In terms of business and professional services, much the same picture emerges. However, both Japan and Germany have large deficits (whereas Canada's is relatively small) caused by the net inflow of services such as intellectual-property income (e.g. patents and copyrights), commissions and brokerage, advertising and insurance. Regardless of the net trading positions, each country exhibits strengths in services trade: for example, intellectual-property income in U.S. exports, transportation in Japanese exports and insurance in U.K. exports.

Canada has achieved comparative and competitive advantages in a range of commercial services and is capable of achieving further success. A comprehensive listing is not possible, but a broad assessment of Canada's comparative advantages in services identified current and potential international trade comparative advantages in the following areas:

- services related to mining, forestry, agriculture, hydroelectric power generation and distribution, geography and climatic conditions (e.g. exploration services, engineering services, resource-based scientific services, land transport and early stage processing);
- services related to overland transportation and communications services, particularly for sparsely populated regions; and
- select producer services in high-technology fields (e.g. biotechnology, computer communications, software and related training and after-sales service packages).

In the service sector, it is the medium-sized firm in Canada that has been the most export intensive in the past. To further assist Canadian firms to be more competitive internationally, especially small and medium-sized firms, a number of issues should be addressed. The availability of personnel trained to deal with marketing, cultural issues and market intelligence is critical in this context. Travel and telecommunications costs, which are typically high, are business expenses that must be incurred to build a credible international reputation for Canadian firms, the cornerstone for competing globally. Financing, whether for working capital, growth capital or the necessary funds to enter export markets, presents a difficult problem for small and medium-sized service companies, in part because they often lack the assets necessary to meet the requirements of lenders. In addition, innovative approaches to the international marketing of services by Canadian firms, such as skills and information networking, and joint ventures, can help firms become large enough to compete against much larger rivals in the international arena.

In summary, Canada's overall trade in services, as measured in the Balance of Payments Accounts, is declining in relation to overall trade, despite rapid growth in international trade in business services. The increasingly global nature of services supply and demand has meant the heightening of competition in world services markets for Canadian firms. As a final note, the conceptual and practical problems in measuring services trade are monumental. Most observers agree that official trade data systematically underestimate Canada's trade in services, a situation that exists in other countries as well. Much more work is needed in this area.

Strengths and Weaknesses

In 1986, ISTC undertook the most significant and extensive analysis and policy review to date of the role of the service sector in the Canadian economy. The \$2.4-million Service Industries Studies Program, implemented over the 1986 to 1988 period, was designed to develop a greatly improved understanding of the role of the service industries in the economy. The research demonstrates the major economic role played by the service sector, corrects many of the misconceptions and undue concerns over its relatively rapid growth, and identifies the major strengths and weaknesses inherent in the sector.

The following sections review some of the key factors identified by this research that underlie service sector competitiveness.

Surveying and Mapping

The surveying and mapping geomatics industry is both competent and well managed, with a world reputation for innovative mapping programs. The industry comprises 1 200 firms and employs approximately 9 000 people. In 1986 revenues were \$521 million and exports were \$92 million. Approximately 66 percent of industry revenue is derived from land development and resource-based engineering construction markets; the remaining 34 percent represents public procurement by federal, provincial and municipal governments.

The Canadian industry is being challenged to adapt to rapid technological change at a time when markets demand faster, more-reliable services based on advanced information technologies (e.g. satellite positioning systems and high-performance portable computers to integrate digital information systems for geographic, spatial or land-related purposes).

Technology

Technological change, particularly in information technology, has emerged as a key strategic variable necessary for the continued health of the domestic service sector and for greater success in international trade in services. New technologies are reducing the demand for labour of a low-skill, repetitive, clerical nature in the telecommunications, financial services and the retail industries, to name a few.

Information technologies have also led to the development of new and improved services and increased the tradeability and capability of service firms to engage in international trade in services. Technologies now combine advances in computer and telecommunications technologies to link: the office and the factory; disparate parts of multinational enterprises; and suppliers, manufacturers and customers. This gives rise to demands for a broader range of sophisticated support services and for highly skilled personnel.

Distributive Trades: Wholesale Trade

Wholesale industries have enjoyed economies in the efficiency and effectiveness of operations and distribution networks. Wholesaling has also become information intensive. With the requisite resources necessary to invest in sophisticated computer data processing, communications systems and other innovations, wholesalers have maintained a competitive position in the market.

In 1990:

- the wholesale industry employed 587 000 Canadians
- over \$27 billion of Canada's GDP came from the wholesale industry.

In the wholesale sector, the adoption of new technologies includes such functions as warehouse management, inventory control, logistics and materials management, and communications systems. Improved efficiencies have been stimulated by the need to distribute goods over long distances through multi-facility national or regional distribution systems.

The increased value of information has led to a growing global willingness to strengthen the protection of intellectual property in the international trading context, particularly on the part of the advanced industrial nations. Canada has a lot at stake, with a strong interest in creating intellectual property, and selling technology and technology-intensive products and services. On the other hand, as a continuing large, net importer of such products and services, Canada seeks an international intellectual-property system that ensures the free flow of such valuable inputs.

The People

Foremost among the conclusions of the research is the drastic need to better the skills of the labour force by significantly improving basic education at the secondary and post-secondary levels, ensuring that the right mix of graduates is produced with the professional qualifications and skills necessary to meet the needs of the growing service industries as well as the increasing services component of the goods-producing industries. In addition, it suggests that industry-supported training and apprenticeship programs require significant expansion, and that government training programs shift their training emphasis to meet the needs of the service sector, in particular, the producer services.

Commercial Education and Training

The domestic market for *commercial education and training* is relatively new, but international opportunities began to grow in the 1960s. Commercial training and education in Canada is supplied by private firms, business and professional service firms (e.g. chartered accountants and consulting engineers), private independent schools and licensed private business, trade and vocational schools, and the commercial activity of colleges and universities.

- The industry is made up of a large number of firms.
- In 1988 Canadian businesses spent \$6 billion on training and development for three million employees.

Demand for these services is expected to grow as businesses seek out more highly skilled workers to meet competitive pressures of their own industry. This may lead to increasing foreign competition in the domestic market. Internationally, there has been an increase in non-aid education and training projects. Together with aid-related projects, commercial education and training firms must focus their activities on identifying opportunities, and marketing their services abroad.

Studies continue to suggest a parallel between the need for long-term investments by industry in human capital and in long-term investments in R&D. Specific issues related to the findings include the following: the need to ensure better cooperation among industry, the educational systems and governments; the need to develop better systems for assessing and forecasting skills requirements and developing more flexible and responsive institutions and systems; the relative tax treatment of human and physical capital investments; and the need to identify incentives to encourage greater efforts on the part of industry to train and retrain its employees.

Management Consulting

Management consulting is an information and advisory service provided by specially trained, experienced professionals. The Canadian industry is recognized for its expertise in general management functions, resource harvesting and processing, communications, and in services areas such as government, education and health care.

- Total employment in the industry was approximately 25 000 in 1988.
- Revenues approached \$1.5 billion.

Global competition, the acceleration in the rate of technological change (innovation in particular), industrial restructuring across the economy and the changing socio-economic environment will give rise to major challenges for this industry.

Service industry unions also can play an important role in the future skill level and training, and hence the general well-being of service sector employees. However, unions are not major elements in all service sectors. Driven by relatively low wages, poor management and discriminatory practices against women in the same sector, labour unions made steady progress in the 1980s in various service industries. However, the highly fragmented Canadian service sector continues to be characterized by some highly unionized sectors, while others are almost totally non-unionized. Whether unionized or not, the major industrial-

relations issues that confront service sector firms and employees reflect the concerns already expressed: technological change; part-time work; and pay equity. These concerns must be addressed to place Canadian industry in a competitive position, in both the domestic and global context.

Distributive Trades: Retail Trade

The *retail industry* is dependent on the healthy growth of the economy, population, employment and income. Retail sales declined significantly during the early 1980s, but have since experienced a strong recovery led by consumer durables.

In 1990:

- 6.1 percent of Canada's GDP originated in the retail sector, and
- the retail sector employed 13.2 percent of the Canadian work force.

The lack of skilled labour is beginning to have an impact on the sector. In the 1990s, the retail sector will have to make increasing use of information technologies. Innovations (e.g. bar codes, debit cards, and electronic data interchange) will affect the nature and scope of competition.

Of particular importance to the retail sector is general tax reform and the GST, and the growth of cross-border shopping. Trucking deregulation has been providing retailers with opportunities for transportation cost-reductions and efficiency improvements. However, the industry remains concerned that some provinces may not proceed with certain aspects of deregulation, thus inhibiting the potential gains in efficiency and in competitiveness for transportation users.

Government Sector and Services

Governments play a major role in the service sector as providers of critical services to Canadians (e.g. education, and health and welfare services), as regulators of key sectors such as transportation, communications, utilities and professional services and, in certain sectors, as the owners of a major firm (e.g. Ontario Hydro). Governments are also major purchasers of many services.

Advertising

The Canadian advertising industry comprises over 625 establishments that maintain standards and a code of conduct through self-regulation, as well as government regulation. Consolidation through merger and acquisitions during the 1980s has prepared the industry to be more competitive for the evolving global marketing of clients in the 1990s.

- In 1987, the advertising industry accounted for over \$1.2 billion of GDP.
- The industry employs over 6 000 Canadians.

The creativity of personnel is an advertiser's key asset. Although computer technologies are used widely by Canadian firms, they have been slower to adopt new technologies than the affiliates of U.S. firms in Canada. In the 1990s, the Canadian advertising industry must move increasingly to offer a full line of services to be more competitive in this global business.

Regulation and Ownership

Some concern has been expressed over government regulation and ownership in the services sector. This is based on the perception that regulation or ownership by government reduces the incentives for industry to innovate and respond to changing technology, demographics and consumer tastes. There is also a view that technological advances are permitting competition to take on many new and different forms, thus negating, or making counter-productive, existing regulations and the policy reasons that initially supported government ownership of commercial firms.

Procurement

Governments play an important role in the service sector as purchasers of a wide variety of services, including advertising, telecommunications, professional, construction and related, and various specialized consulting services. Engineering and development of major hydro projects in Quebec, and the impetus this gave to the development of world-class consulting engineering firms, demonstrate how important procurement can be.

Thus, significant room remains for obtaining industrial benefits from further regulatory reviews and privatization in the service industries. The contracting out of services by government and the related trend toward privatization of government-owned commercial corporations may help to further develop the services sector.

The Insurance Industry

The insurance industry in Canada is highly competitive, both domestically and internationally. It is stable and mature, with a large capital base, and the use of new technologies has improved the productivity and efficiency of insurance companies. The industry has succeeded in rationalizing operations, as well as developing innovative products. Canadian life-insurance companies have also been successful in foreign markets where their net income is reported to be rising faster than in Canada.

In 1990:

- Life and health insurance companies (168) generated over \$3 billion of Canada's GDP and employed over 65 100 people.
- Ten life-insurance companies, eight of which are Canadian, accounted for about 61 percent of the total net life and annuity premiums.

In the future, changes in regulations and the tax regime are expected to increase competition and strengthen the industry.

Outlook for the 1990s

The focus of the Canadian economy is continuing to move away from the goods sector, as is the case in most developed countries. As firms increasingly concentrate on core businesses, both in the goods sector and service sector, and new and changing technologies drive specialization within service firms, the producer services sector can be expected to continue to grow, and account for a greater share of service-sector output. The consumer services share, on the other hand, is not expected to rise appreciably in the near future. The largest influence on the growth of consumer service demand has been the increasing participation of women in the work force, a trend which

Industrial Design

The industrial design industry in Canada conceives products and the packaging for goods manufactured in Canada and abroad. It is a small dynamic group of 100 firms, employing over 400 Canadians. The industry is Canadian owned and controlled, and companies are generally small, with partnerships and sole proprietorships making up a large portion of the industry. The Canadian industry is active internationally, especially in the U.S., and those Canadian firms that have an international presence report over 50 percent of billings as exports.

The Canadian industrial design service industry grew strongly during the 1970s and 1980s, but is now faced with the constraint of a small domestic market and the slow change of Canadian products. Successful competition depends on the reputation of the firms and people who make up the industry. Consequently, the key asset of the industry is the skill level or training of individuals in the firm. Many are university trained, but skill development on the job plays an important role in the industry as well. Technology, in the form of computer-aided design (CAD), has also been an important asset, with those firms using CAD reporting superior productivity.

Future challenges for the industrial design service industry appear hinged on a marketing strategy directed toward the global approach to design. Small firms, which dominate the industry, may face heightened costs of international marketing and investments in technology.

appears to have approached its upper limit. Growth in line with the rest of the economy is the most that can be expected for the consumer services sector. In the past few years the share of government services has declined and it does not appear that this trend is about to change.

The uncertainty about the future course of the Canadian economy is matched by uncertainty about how the service economy will evolve (its role in the future of the economy). On the one hand, the Canadian service economy has not reached the same level of importance as has the U.S. service economy, yet it has developed to a greater level of importance than in Europe. One thing is clear: if Canada does not continue to develop internationally competitive service industries, we will not have a competitive economy.

The Banking Industry

The banking industry, one of the most heavily regulated industries in the economy, is dominated by a few large players that are among the best capitalized banks in the world. Competition has been intense as trust companies, life-insurance companies and securities dealers have also been seeking to expand market share.

In 1990:

- The banking system contributed over \$10 billion to Canada's GDP, employing 181 000 Canadians.
- Canadian banks operated through more than 200 foreign branches and many subsidiary and agency offices.

Modern banking depends on technology to deliver services competitively. Due to a commitment to invest in new information technologies, the Canadian banks are well placed to respond to technological innovations. Other future issues and challenges include new financial products that have changed the commercial credit markets, uncertainties in the Euromarkets, and new competitors from the commercial sector. Canadian banks appear well positioned to respond positively to these challenges.

A Sectoral Agenda for International Competitiveness

Service firms are capable of benefiting significantly from a broad range of government industrial programs in areas such as trade development, procurement, domestic and international financing, and labour market development and adjustment. But the private sector (both business and labour) also has a major role to play in improving its competitive position and adjusting to a dynamic set of market forces. A number of these issues must be dealt with sector by sector, with cooperation among business, labour and government to share information and ideas to promote services competitiveness — the ultimate goal. Too often in the past, the relationship between governments and service industries has been either antagonistic, based largely on heavy regulations, or has been based on neglect and indifference. Future competitiveness requires that cooperation replace antagonism, that recognition and understanding replace neglect.

Horizontal Issues

The widely different circumstances and structures in the service sector demand that many specific issues and measures be dealt with on a subsector or industry basis. However, greater cooperation and interaction between services and goods-producing firms, both in technological development and marketing, would appear to highly benefit industrial development and international competitiveness in a number of sectors.

From the federal government's perspective, the research suggests that the focus should be on education, training and information policies; targeted industrial policy and program approaches that promote entrepreneurship, linkages with other sectors, technology transfer and diffusion, and management excellence; and the diffusion of information on domestic and international markets for services. Keeping in mind the strong connection between the services and goods producing sectors of the economy, programs that promote the growth of large sectors of the economy at the expense of other sectors would be counter-productive. Consequently, federal government policies and programs should be designed to promote the industrial development of all sectors.

Global competition in service industries is growing faster than in the case of many goods industries. For the service firm, even the small one, this means that its information base must grow — what goes on in the world around it must become a part of the way it does business. Service firms must also seek out and adopt the newest technologies. They must employ and continually retrain knowledge-based workers, while insisting that educational systems provide the best-educated workers in the world with the skills that are required. To accomplish such goals, they must develop stronger industry organizations, capable of representing them effectively and of making their opinions and needs known.

Productivity, and hence performance, in the service firm is becoming increasingly dependent upon the knowledge of the worker. Best practice techniques, as well, will increasingly determine not only success, but also survival in the new global market. For the employee, manager and entrepreneur, this requires a continuum of learning within the firm and outside, where educational facilities offer the means of perfecting skills.

To a certain extent, governments can assist in the adjustment to global competition. For example, questions arise about the impact of the tax system on the growth of the service sector, relative to the goods-producing sectors. There is a view that the tax system is biased toward promoting the goods industries. The broadest question relates to whether the accelerated depreciation, depletion and similar provisions in the present tax structure favour the *physical-capital-intensive* goods producers over the *human-capital-intensive* service producers. However, human-capital-intensive firms do benefit from large government subsidies to education.

A related question concerns whether the tax treatment of R&D expenditures in service firms might better recognize the contribution such activities make to the knowledge base and competitiveness of firms in the broad range of Canadian industries. Further research into the process of innovation and technological development in specific service industries and the ways in which technology is transmitted by service firms to the rest of industry is required. This is needed before practical proposals can be formulated for the appropriate means of stimulating the development and diffusion of service sector technologies. In addition, attempts to promote R&D and technological advances in Canadian industries need to be consciously linked to the promotion of related human-capital development.

Environmental Issues

As stated in the recent *Speech from the Throne*, the revitalization of Canadian competitiveness will be fully compatible with a vibrant natural environment. Federal environmental policy (the *Green Plan*) is committed to ensuring that economic growth occurs within the context of preserving the environment. This fundamental approach will affect not only Canada's resource-based industries, such as pulp and paper, mineral extraction and processing industries, but governments as well, which provide many basic services, such as garbage disposal, sewage and hazardous-waste treatment. Canadian environmental service firms, many of which are internationally competitive in their fields of specialization, currently possess the expertise to offer solutions to many of the environmental problems facing Canada. Solutions

will be more readily adopted if the linkages are strengthened among the producers of environmental products, the service or solution providers, and the user industry (or government). Based on achievements in the domestic market, Canadian firms will then be in a better position to increase their share of global markets.

Both technological change and the availability of skilled personnel figure highly in the future of the environmental service industry. A dynamic environmental service industry will be a key contributor to the international competitiveness of all sectors of the Canadian economy.

The Environmental Services Industry

The environmental services industry provides consulting and engineering, scientific and technical services for the conservation, protection or enhancement of the environment. The industry, driven by regulatory regimes in upstream markets, is highly fragmented and has experienced dynamic growth. Municipalities present the largest market for environmental services followed by the pulp and paper industry, forestry services, chemical industries and utilities.

Many Canadian firms have been successful internationally, especially in the U.S. and Asia, and are world leaders in a number of market niches. Limited foreign competition is experienced domestically.

- \$5 to \$7 billion is spent annually in Canada on environmental services and goods.
- More than 91 000 Canadians are employed in the industry, one half to two thirds of which are in the private sector.
- The environmental services market is expected to grow 5 to 7 percent annually in the short term.

While the future prospects for the industry appear optimistic, some issues that face the industry still require attention. The shortage of qualified personnel at the supervisory and entry levels is important. Other issues that may constrain the future growth of the industry include poor linkages between the producer of the service and the user industry, the large proportion of public sector participants in the industry, and the slowness of technology transfer between the public and private sectors.

Regional Approaches

Government policies for the regional development of service industries may benefit from more attention being given to the potential for the development of producer services. Policies must be highly targeted and take into account the actual or potential linkages between producer services and the local base of goods-producing and other service firms, as well as the availability of highly trained, skilled labour.

Because of the potential role for small new producer services in the export of services from a region, policies to encourage entrepreneurship and the start-up of new firms would be appropriate. These policies should emphasize establishing seedbed and incubator-type programs, transferring technology, developing the needed labour supplies and skills, and promoting an environment where creativity and risk taking is encouraged.

There is a case for optimism in the development of service industries in the regions of Canada. The private sector, in setting a regionally sensitive agenda for developing the service industries, must focus on new technologies and advances in information capital. The linkages between goods production and services demand provides one example. In addition, because the use of technology has intensified in some service sectors, it is no longer necessary for these service providers to be located near their customers. Also, access to large consumer markets is not a prerequisite for supplying some services, which is not the case for many goods industries. Such examples support regional location of many service-producing firms. Smaller, regionally based service firms must identify and exploit the potential to expand beyond their local markets, and recognize the threats that may come from outside firms.

Opportunities for Deregulation and Privatization

In many of the Service Industries Studies Program's studies of the transportation, telecommunications, banking and insurance industries, regulation is found to be an obstacle to the innovativeness and dynamic development of these industries. This is largely because technological advances are permitting competition to take on new and different forms.

The issues relating to decisions on privatization and deregulation are very complex and must be decided on the basis of in-depth analyses of specific regulatory situations. Significant room still remains for obtaining industrial benefits from further deregulation in the service industries. In addition, regulation has come to be recognized as a significant factor affecting services trade performance and the trade policies of nations. As a result, these issues are on the policy agendas of other countries.

Wide variations in provincial procurement practices, professional accreditation requirements, standards and licensing are interprovincial barriers to trade in services. As noted in the *Speech from the Throne*, these barriers must be eliminated in order to foster competition in the services sector.

Education and Training

Neither the educational systems nor Canada's training and skills development programs in the private and public sectors appear to have responded adequately to the changing educational and skills requirements arising from the shift in employment toward services.

The following areas require close attention:

- the need for a significant expansion of training and retraining efforts and initiatives on the part of Canadian industry;
- the need to improve significantly the basic skills of the labour force by achieving higher standards of basic education;
- at the secondary and post-secondary level of education, the need to improve the educational systems and ensure they are producing the right mix of graduates with professional qualifications and skills to meet the needs of the growing human-capital-intensive service industries; and
- the need for a similar shift in emphasis of government training programs.

These considerations raise specific policy issues related to ensuring better cooperation among industry, the educational systems and governments; developing better systems for assessing and forecasting skills requirements, and more flexible and responsive institutions and systems; and identifying incentives to encourage industry to train and retrain its employees. The need to ensure long-term investments in human capital parallels and complements the need to encourage long-term investments in R&D.

Information and Intellectual Property

Information capital is one of the key elements necessary for a healthy domestic service sector and for success in international trade in services. A strong emphasis on information and intellectual-property policies is required, an emphasis that, in a sense, parallels the similar emphasis on human capital and education and training policies.

There is some evidence to suggest that Canadian service firms are reluctant to adopt new technologies, while research has demonstrated that the adoption of new technologies is key to remaining internationally competitive. Canada's service industries must commit themselves to making the investments in technology and information capital necessary to keep pace with global markets. In particular, this is a means of assessing information, reducing costs, upgrading quality and establishing strategic international linkages.

There exists a growing willingness to strengthen protection of intellectual-property rights in the international trading and negotiating context, particularly on the part of the advanced industrial nations.

Canada has an interest in optimum, not maximum, protection for intellectual property. In this respect, Canada has a negotiating interest in achieving an international framework that recognizes intellectual-property rights and is consistent with reasonable access to new information-based products and services.

Other major issues to be addressed include: policies toward intellectual property and cultural industries, public investment in communications systems, the rules and prices governing access to data bases and information-retrieval systems, costs of communications services to user industries, the scope for further deregulation, and the nature and importance of international barriers to trade in information services.

International Trade in Services

As a relatively open economy for services, Canada stands to benefit from encouraging potential trading partners to pursue similarly liberal policies. The FTA provides freer access to Canada's largest market for services (there are exceptions, notably in transportation services), while a NAFTA would expand those benefits to include Mexico. The MTN offer a significant opportunity for trade liberalization — an important consideration in view of the EC's objective of a single market by 1992. A strong contribution to the

Uruguay Round of the GATT (in services) is clearly a top public policy priority.

Canada must, however, improve its information on: the specifics of how individual service sectors trade; the interests of exporters and importers of services; the key barriers to trade that would benefit Canada if eliminated; the key traded services with the potential for success in international markets; linkages between services and goods in trade; and the interests of other countries, particularly less-developed countries. At the same time, efforts to improve our trade statistics need to continue and be expanded, along with our efforts to accelerate international cooperation on the development of services trade classifications and data.

Research performed on behalf of ISTC by the Canadian Exporters' Association identifies a number of problems that detract from Canada's success at exporting services. The study identifies the critical need for Canadian service providers to improve their internal marketing capacity and to develop strategic international alliances, as well as capacities to meet the needs of foreign markets. Firms must seek innovative means of collecting timely market information, of ensuring the continued availability of skilled marketing personnel, and of gaining exposure and developing their reputations in international markets.

The study also cites the past ineffectiveness of federal government in dealing with a broad range of service-specific issues, including defining services, developing an awareness of service exports and their importance to Canada, and creating the appropriate policies and program supports for services. While some progress has been made, through the Service Industries Studies Program, in addressing the two former concerns, much work has yet to be undertaken to come to a better understanding of service export problems and issues, and to create and promote policies to provide support for the service sector. High on the list of support mechanisms identified by the Canadian Exporters' Association study is the need for a concerted marketing infrastructure and financing

support for exporters, especially in regard to small and medium-sized businesses, which are more service export intensive. Assistance in gaining market intelligence, developing broader initiatives (such as developing marketing plans to confront global competitive issues) and being able to access export-financing support mechanisms in some subsectors (especially when they must compete against foreign firms receiving government assistance) are identified as critical support mechanisms.

A Statistical Development Policy and Program for Services

The development of a deeper understanding and appreciation of the role of services in the economy has been hindered severely by the lack of adequate statistics on all facets of the service sector, including its structure, conduct and performance. Clearly, more resources must be devoted to the development of service-sector statistics. These data will permit us to deal more effectively with such matters as improved productivity and output measures, the study of inter-industry linkages, international services trade measurement, and regional development issues — for a sector affecting three quarters of the labour force.

Statistics Canada designed, but has not fully implemented, a five-year program leading to the development of a more complete product classification system for services and, ultimately, to a more comprehensive survey of service industries. This survey will include better measures of services products and prices, and better estimates of real output, productivity change, and trade in services. Full implementation of this initiative would strengthen the entire statistical system for both goods and services and would, over time, bring us closer to a statistical data base for services that parallels the one for goods. It would also pave the way for more relevant research and policy development and implementation, in all of the public policy areas discussed above, for the entire economy.

THE CONSTRUCTION SECTOR IS A LARGE AND DIVERSE INDUSTRY INVOLVED IN A variety of activities including the planning, engineering, building, renovation and repair of buildings and infrastructure (such as roadways, railways, buildings, canals, dams, sewers and water lines). The construction industry designs and builds Canada's infrastructure for future generations. The sector's ability to design and construct facilities within budget and on time is a key factor in the competitiveness of all the clients this sector serves.

Structure

Construction and construction-related activity in Canada totalled almost \$82 billion in 1987, about 15 percent of the GDP. There are approximately 136 000 contracting, engineering and architectural firms employing an estimated 673 000 people.

Construction activity in Canada is performed both by contracting construction firms and by enterprises doing their own construction work. In broad terms, the contracting subsector of the industry consists of general building and engineering contractors who undertake entire projects, and trade contractors who perform specialized services such as site preparation, structural steel and concrete work, mechanical and electrical work, and other interior and exterior work. The latter normally operate as subcontractors to general contractors. This relationship provides a division of responsibility and specialization of skills, and also helps to reduce financial exposure by spreading the risks on projects.

The contracting subsector comprises 130 000 establishments that generated nearly \$46 billion of work and contributed 9 percent to the GDP in value-added (excluding the value of material and other services). The sector has a large number of small firms. The largest 5 percent of the firms (6 500) do almost 60 percent of the work, valued at \$27.6 billion. The remaining 123 500 companies do \$18.4 billion of construction work.

In addition to the work performed by the contracting subsector, approximately 45 percent of all construction activity in Canada is undertaken in-house by such enterprises as utilities, governments, and companies not primarily involved in the sector.

Canadian construction companies are oriented to the domestic market. Only a small nucleus operate in export markets, usually when Export Development

Corporation or Canadian International Development Agency financing is made available. Canada, unlike the U.S., Japan and several European countries, has not developed large, integrated, national construction companies with the financial strength to undertake major turnkey projects.

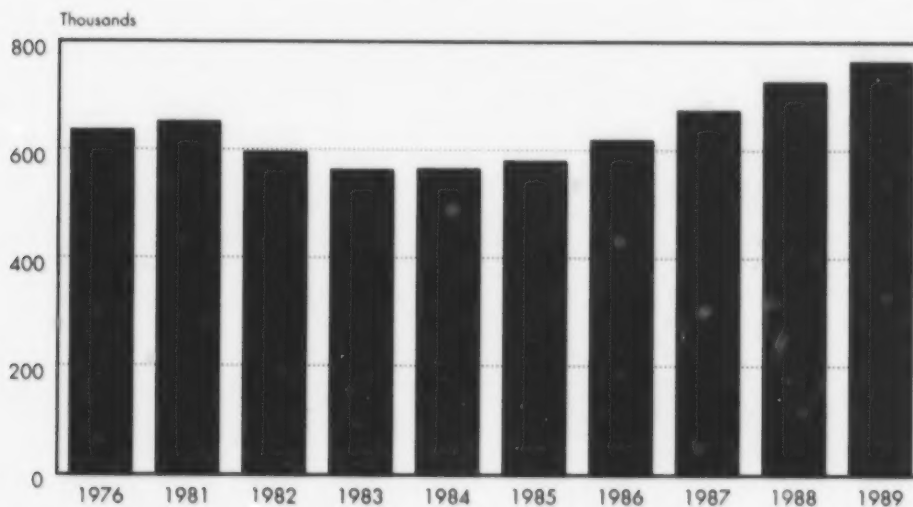
Estimates for 1989 indicate that Canadian construction contractors obtained \$1 billion in foreign contracts, while \$7 billion in domestic contracts were awarded to foreign-owned construction companies. In both cases the bulk of the contract value was spent on labour, materials and equipment that were procured locally, so that these estimates do not reflect balance-of-payments levels.

Canadian consulting engineering firms, on the other hand, have had much greater involvement in foreign capital project markets, and several have evolved into large organizations whose reputations are recognized internationally. Approximately 13 percent, or \$475 million, of consulting engineering total billings of \$3.8 billion are generated by export activity.

Until recently, the domestic construction market experienced the largest growth in the residential sector. The heavy engineering area experienced a relative decline over the past five years, particularly in energy sector projects. In 1987, residential construction accounted for 44 percent of the total share, while engineering projects accounted for less than 30 percent, compared with 29 percent and 45 percent, respectively, in 1981.

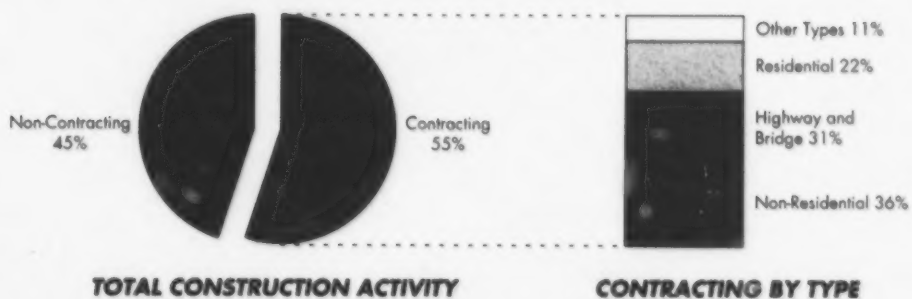
As a result of the recent economic slowdown, annual growth rates have dropped sharply since 1989, after several years of unusual strength. The residential construction subsector has been hit particularly hard, with new housing starts dropping from 246 000 in 1987 to 182 000 in 1990. This subsector is likely to be the first to recover, especially if interest rates

CHART 1
CANADIAN CONSTRUCTION EMPLOYMENT



Source: Statistics Canada.

CHART 2
CONTRACTING VS. NON-CONTRACTING CONSTRUCTION,
1987



Source: Statistics Canada and ISTC.

to be the first to recover, especially if interest rates continue to drop.

Such cyclical slowdowns result in severe reductions in employment in the sector and place the economic viability of firms in jeopardy. Similarly, during boom times, firms have often been forced to pay premiums for labour and material.

Performance

The Canadian construction sector has been successful in the domestic market. This, in large measure, is a result of the efficiencies required to meet the strong competition among Canadian firms, and of the extensive specialization, particularly among the trades.

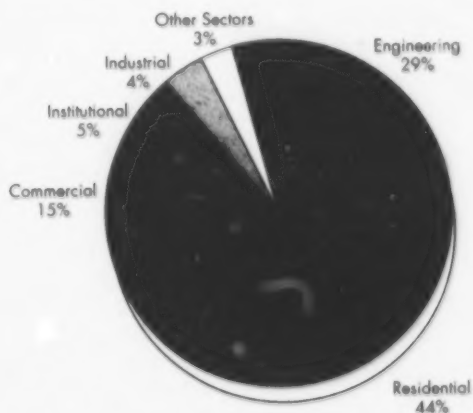
There has been a general, steady gain in productivity performance from 1970 to 1986. The Canadian industry averaged an annual increase of 2.8 percent. Comparative statistics on productivity tend to be limited, and it is unclear how Canada compares against newly industrialized nations (such as South Korea and Singapore), who are capturing a growing portion of the world market. Although no published information is available, labour productivity in Canada is thought to be ahead of the U.K., but lagging behind Germany and Japan. Relative to the U.S., the Canadian industry appears to have performed better,

but there is some question as to the comparability of the data available.

The statistics do show that U.S. labour costs have increased 8.3 percent, compared with 5.3 percent in Canada over the period.

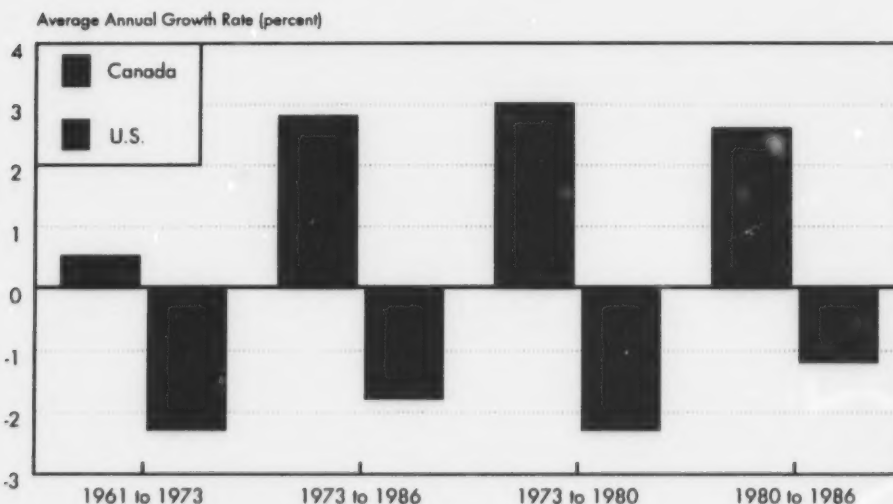
Many of the largest heavy civil-engineering firms, in Canada and abroad, encountered financial difficulties during the 1980s as a result of reduced levels of investment in major resource-based projects and infrastructure. Further, the restrictive nature of the bidding process in North America, coupled with heavy competition for fewer jobs, cut profit margins, resulting in many firms having to restructure or severely reduce their scope of activity. When measured in real terms (i.e. net of inflation), the sector's growth had fallen from \$4.8 billion in 1977 to \$3.5 billion in 1987, peaking at \$6.8 billion in 1982 when the recession began affecting capital project investment. During this period, the sector recorded an annual decline in growth of 3.2 percent. By comparison, the real output of the whole construction industry expanded during the same period, from \$53 billion to \$63 billion, recording an annual increase of 1.7 percent. Net profits before taxes dropped from 3.9 percent in 1977 to 1.6 percent in 1987.

CHART 3
TOTAL CONSTRUCTION BY SECTOR, 1987



Source: Statistics Canada.

CHART 4
CANADA-U.S. COMPARISONS: CONSTRUCTION
PRODUCTIVITY GROWTH RATES (Various Periods)



Source: Economic Council Paper (1990).

Strengths and Weaknesses

Productivity is essential to the construction sector's ability to compete, and a competitive construction sector benefits the entire economy. For example, a 10 percent increase in efficiency through better management, optimum use of labour, capital and materials, and better building technologies can contribute \$8 billion of direct savings in the \$82 billion annual Canadian construction program. These savings translate into more competitive Canadian products and services, in both domestic and export markets. Unlike many emerging competitive countries, the impact of the construction sector on the economy is only now becoming recognized in Canada. In emerging countries, construction is frequently recognized as having a strong national presence.

Several of the most important competitiveness issues include: human resources, training and labour mobility; technology in construction; management processes and practices; competitive financing and taxation; internal trade; risk management and vertical integration; and infrastructure renewal.

Human Resources, Training and Labour Mobility

Construction employers and employee organizations have developed joint initiatives to improve productivity through more effective apprenticeship training, greater availability of skilled tradespeople and better construction safety. Currently there are joint industry-labour efforts to improve labour mobility in Canada through a national *Red Seal* certification program on apprenticeship trades. Business and labour were involved in the Apprenticeship Task Force, which submitted a report to the proposed Labour Force Development Strategy in 1990. The report suggests that business and labour get a greater say in setting standards and curricula for apprenticeship training.

The sector expects that the new Labour Force Development Board will recognize the importance of apprenticeship training. The Board is mandated to advise governments on labour-related issues. Highly qualified personnel who are certified to work in more than one province are of critical importance to Canada's prosperity and competitiveness. Many

tradespeople working in manufacturing and resource industries were originally trained under apprenticeship programs in the construction industry.

In addition, both business and labour share the view that the current treatment of employment-related expenses under the *Income Tax Act* severely limits worker mobility in construction. By preventing the deductibility of individual employment-related temporary relocation expenses, the Act treats construction workers differently from self-employed people and travelling sales representatives.

Technology in Construction

In addition to highly qualified personnel, competitiveness is based upon adoption of advanced technology by the construction industry. Since the sector is highly fragmented and dominated by small firms, there is a need to improve the links between the sector and technology centres (such as universities) in order to promote the development and use of advanced technology.

There is an immediate need for R&D to increase the use of microprocessing technology in the industry, to promote greater use of advanced industrial materials and to develop new technologies related to material handling and environmental concerns. The National Research Council, through the Industrial Research Assistance Program, is supporting a national network of 34 technology advisors to help small and medium-sized construction contractors to implement new technologies into their firms and work sites. This program has had a good response from the sector.

Management Processes and Practices

Large and increasingly more complex capital projects require higher levels of project management competence. In Canada, the management of the individual elements of a capital project, from concept to implementation and operation, is considered to be good. To remain internationally competitive, management processes and practices need to be better integrated and streamlined.

The process of conceptualizing and developing major projects that are efficient and effective is a topic of study by the Construction Industry Development Council, an advisory council to the Minister of Industry Science and Technology Canada.

Competitive Financing and Taxation

Given the international competitive situation, the availability of support being provided through Canada Account Financing (section 31) of the Export Development Corporation (EDC) has been of great importance to the international capital projects sector. This financing supports projects in countries where the risk is such that traditional lenders are not active, and is often needed to match the funding provided by the governments of Canada's competitors. However, concessional funds have been fully committed in the last two years, and support has been withdrawn from many markets where concessional financing is required.

China had the only market where a concessional line of credit remained available to support Canadian exporters, but the level of activity was reduced because of budget constraints. Exporters were encouraged to focus on markets where concessional financing is not required. The provision of concessional financing, for some projects, permits Canadian construction companies to better compete against their mostly larger international competitors. Both EDC corporate account financing and Section 31 non-concessional funds were (and are) available for that purpose.

This issue is of particular concern to the consulting engineering community and world leaders in the export of their services. By extension, it will affect the sale of many other Canadian goods and services. The industry considers that competitive financing, including concessional financing, is an investment that not only benefits Third World communities but directly supports the positioning of Canadian exporters in foreign markets and the sale of many Canadian products and services.

Considerable delays often occur in receiving payment for export capital projects. However, income taxes are incurred on an accrual basis and taxes must be paid in advance of receivables being collected. The industry believes this regulation limits its ability to be internationally competitive.

Internal Trade

The sector maintains that interprovincial barriers to the mobility of capital, goods, services and labour hamper the sector in becoming big enough to meet stiffer international competition from large, vertically integrated firms. They also argue that local and regional preferential procurement practices are keeping the sector fragmented, thereby constraining the structural development of the sector and adding significantly to the cost of Canada's industrial and civil infrastructure.

The sector welcomes international trade liberalization, and urges the federal and provincial governments to continue their efforts to reduce trade barriers affecting the construction sector within Canada.

Risk Management and Vertical Integration

The use of the *firm price* bidding process, which involves contractors competing for work on the basis of a fixed price, and the low bidder being awarded the contract, tends to increase the adversarial relationships between the stakeholders of the project, often leading to cost over-runs. This tends to produce protracted and expensive litigation. Some international firms have reduced this risk through vertical integration, reducing the number of stakeholders on a project. To meet this challenge, increasing numbers of Canadian contractors will likely move to acquire an integrated capability through joint ventures, consortia, and so on.

Infrastructure Renewal

The sector is very aware of the link between the condition of the nation's infrastructure, such as highways, and the overall economic competitiveness of the country, and that there is insufficient investment in infrastructure renewal and improvement. The sector sees a potential to strengthen its competitiveness by reducing the cyclical nature of the business through a long-term renewal program.

Outlook for the 1990s

The construction sector is generally well positioned to meet the demands of the domestic market during the 1990s, except for very large major projects on a turnkey basis. The sector is well developed regionally, has access to competitively priced inputs, and has specialized and technically competent managerial skills available to it. It will, however, require continued improvement to maintain and improve its competitive position.

Industrial relations in the sector have generally been managed well, although the large number of small firms, many craft unions and numerous employee bargaining units complicates the process.

Canadian contractors continue to demonstrate modest productivity growth. Although labour productivity is thought to be good, there is a need for continued improvement to meet the challenges of international firms, such as those from Germany and Japan.

The sector will have to face increasing international competition, particularly from the larger vertically integrated firms. Recent events in Eastern Europe should present new market opportunities for engineering firms. The potential for contractor involvement will depend largely on their ability to engineer, procure, and construct in such countries, or on joint ventures with other foreign firms familiar with the market. In addition, access to competitive financing will be important. The existing number of federal government export-support programs should be maintained, as a minimum, to maintain or even to build on our present success.

Anticipated increases in investments resulting from the need to upgrade facilities, clean up sites, and recycle waste products, for environmental reasons represent a significant opportunity for the construction industry as a whole.

A Sectoral Agenda for International Competitiveness

The challenges facing the sector in the domestic market include the need to achieve higher productivity levels through developing and acquiring technology; having a skilled, mobile workforce; removing internal barriers to trade; enhancing management practices; achieving better long-term planning by clients and governments to ease the impact of fluctuations in the business cycle; responding to the new market opportunities in the environmental sector; and meeting the need for new environmental standards.

In Canada, construction R&D expenditures are low compared with other industrialized countries. To advance the technological base, there is a need, in industry, to mobilize increased R&D funds and to develop links between industry and centres of technology. This will facilitate the diffusion of new technology throughout the sector.

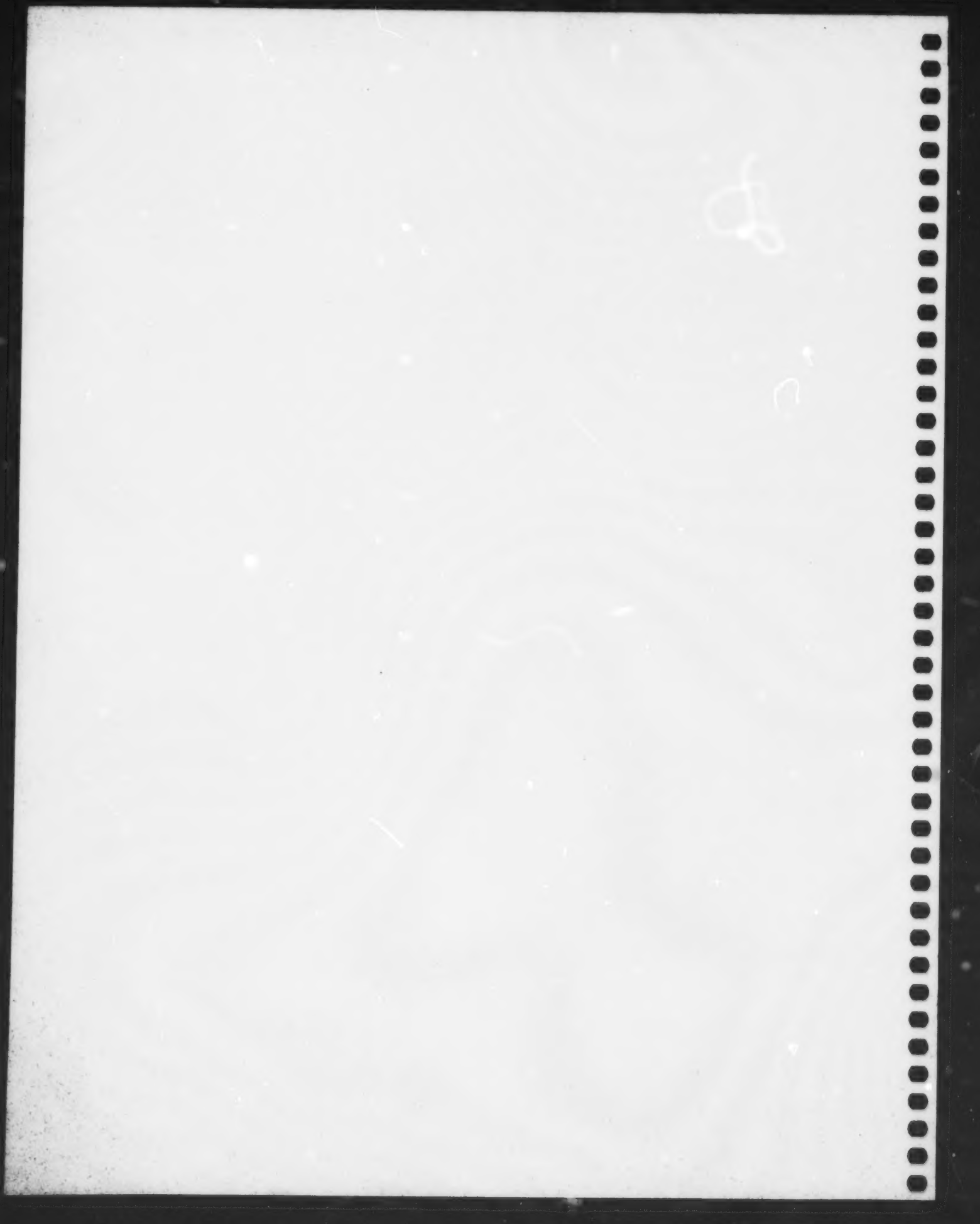
The Construction Industry Development Council is studying the level of management competence necessary to undertake capital projects of increasing complexity. The results of the study and its recommendations are expected in 1992. Particular attention will be paid to actions that improve our management processes and practices. The challenge will be for the sector to adopt the recommendations that are applicable to its own firms.

A skilled, mobile work force, which is certified to work in any province, is important to the efficiency of the industry. The new Labour Force Development Board should be encouraged to recognize the importance of apprenticeship training and to involve the industry in its development of policies and allocation of funds. Expansion of the *Red Seal* program to include more trades and wider acceptance by provinces will greatly assist worker mobility.

Internal barriers and local-preference policies erected by provincial and municipal governments (usually for reasons of regional development) impeded the structural development of the construction sector, add to the costs of Canada's infrastructure, and may constrain the development of large national construction companies. It is expected that construction will be added to the agenda in upcoming federal-provincial discussions on these issues.

The challenge for the sector in the international market will be for Canadian construction companies that acquire the size, design capability and financial strength to compete for large projects where foreign clients are frequently looking for an engineer/procure/construct capability. The sector will need to pursue options that achieve some integration of the activities of consulting engineers and contractors, in order to be able to further penetrate international capital project markets.

In addition, the sector needs to pursue options for improved access to financing. Efforts need to be made to reduce the concessional financing and related incentives provided by other countries, in order to reduce the need for Canada Account financing. As well, the sector needs to develop new and creative approaches to financing international projects.



MAJOR CHANGES ARE TAKING PLACE IN INTERNATIONAL TOURISM MARKETS. THEY offer both opportunities and challenges for the Canadian tourism industry. Canada's ability to maintain its position as one of the top-10 international tourism destinations depends on new approaches and an equal and concerted effort from the tourism industry and governments at all levels.

Structure

World's Largest Industry

Tourism contributes more to global and national economies than most people realize — indeed, it is a major contributor. Yet, because it is so woven into the fabric of the economy, its significance often goes unnoticed.

Globally, tourism is a \$2.5-trillion industry, employing more people than any single industrial sector. In most developed nations, it has become the largest consumer household expenditure after food and housing.

The tourism industry consists of many different businesses, providing a wide selection of products and services. This diversity makes tourism a difficult industry to identify and quantify, and accounts for its seeming obscurity.

Important for Canada

Tourism generated \$26 billion in revenues for Canada in 1990. This is equivalent to 4 percent of Canada's GDP. The domestic market accounted for 71 percent and the international market for 29 percent. Transportation accounted for 45 percent of this total, food and beverages 21 percent, accommodation 16 percent, and recreation and entertainment 7 percent.

The tourism industry has a wide spread between the cost of its inputs and the prices it receives for its outputs, wider than many other industries. In 1990, the tourism industry alone contributed US\$22 billion in value added to the Canadian economy. This was more than the contribution of either the agriculture or auto industries, and more than that of the electronics, textile and steel industries combined.

Tourism adds to Canada's export earnings. In 1990, foreign visitors spent over \$7.4 billion in Canada. This makes the tourism industry the fourth-largest earner of foreign exchange after motor vehicles, auto parts, and communications and electronic equipment, ahead of wood pulp, newsprint, lumber and crude petroleum.

Tourism is an important part of the economy in all regions of Canada. As a percentage of gross provincial product, it ranges from a high of 7.5 percent in Prince Edward Island to a low of 2.9 percent in Quebec, where it ranks as the sixth-largest industrial sector in the province.

Revenues generated by the industry have economic spinoffs. They include \$4.1 billion of investment spending on tourism-related infrastructure across the country. Tourism also generated nearly \$12 billion in revenues for the various levels of government in 1990.

Many Small and Medium-Sized Businesses

In Canada, there are 60 000 businesses in the tourism industry, 85 percent small or medium-sized enterprises. They supply goods and services to business and pleasure travellers. As such, the industry comprises sectors and subsectors of other industries. The National Task Force on Tourism Data identifies the percentage of revenues generated by tourism in key sectors. Major elements of the tourism industry are defined as:

Accommodation	100 percent
Passenger transportation	100 percent
Travel agencies	100 percent
Tour operators	100 percent
Recreation and amusement	47 percent
Rental and private cars	30 percent
Food services	17 percent*
Retail trade	3 percent

* Of all revenues generated by food services, 17 percent is generated by tourism.

A Labour-Intensive Industry

The industry employs one in every 20 Canadian workers, or approximately 615 000 people. The accommodation, food services and transportation sectors dominate the tourism industry labour force, and account for nearly 82 percent of the total. The largest concentration is in the accommodation sector (45 percent). Some 73 000 jobs are in the management and supervisory categories.

Women account for 48 percent of the total tourism labour force. They are disproportionately represented in the accommodation sector (59.3 percent), the food sector (58.7 percent) and the transportation sector (30.7 percent).

A Strategic Role

The tourism industry plays a strategic role in the Canadian economy. As such, it is key to Canada's prosperity. It creates jobs at all skill and experience levels. It can drive development and growth in any region of the country. It is a significant contributor to the GDP, and a major earner of foreign exchange. While domestic travel promotes Canadian identity, international tourism to and from Canada enhances global trading relations and benefits other industries.

Performance

Declining Growth

The rapid growth in world tourism of the past 40 years has slowed considerably. In the 1950s, arrivals grew at just under 12 percent a year. In the 1960s, the rate of growth was just over 8 percent a year, in the 1970s, about 6 percent a year. The 1980s showed a growth rate of only 4 percent a year.

The decrease in growth of visitor arrivals, decade by decade, has been matched by reduced growth in annual receipts. The average annual increase of just over 14 percent in the 1950s fell to about 8 percent in the 1980s.

Canada's tourism industry has benefited from growth in worldwide tourism, and has competed successfully in the international market. Revenues generated from international travel to Canada have been growing at rates that compare favourably with those of other major world tourist destinations. For example, between 1980 and 1988, Canada's international tourist receipts grew by 9.2 percent per year

(on average). This rate was exceeded only by Japan (20.3 percent) and Australia (12.9 percent). Canada ranked ahead of the U.S. (7.8 percent), Switzerland (7.6 percent), France (6.7 percent), the U.K. (6.1 percent) and West Germany (3.2 percent).

This growth in international receipts is reflected in Canada's ranking among world tourism income earners. By 1989, Canada placed ninth. Its share of income earnings among OECD members showed a slight increase from 3.2 percent in 1980 to 3.4 percent in 1989. This performance was due to high rates of growth between 1983 and 1988 (10.8 percent on average). This offset the lower rates experienced during the recession of 1981-82.

Since 1988, there has been a marked downturn in the growth of international receipts. By 1989, Canada had dropped to fourth place in growth rate in international receipts among OECD members. The U.S. took second place from Australia, which shifted to third. France recorded the highest rate of growth in 1989. This reduction is due to negligible growth in U.S. receipts and slower growth in visitors from overseas, with the exception of Japan.

The U.S. is Canada's largest market for international tourists. It accounts for 80 percent of international visitors and 60 percent of international receipts. Canada's share of the American outbound market dropped by 5 percent since 1984, from 33 percent to 28 percent. In 1989, the number of American visitors dropped by 4 percent and remained flat in 1990.

Domestic travel increased by only 6 percent during the 1980s. Domestic pleasure travel declined by about 6 percent over that period. But the decline was offset by a strong increase in business travel. As a result, domestic pleasure travel's share of Canada's total tourism receipts dropped from 78 percent in 1980 to 71 percent by 1989.

Canadian outbound travel has expanded dramatically. It increased by over 60 percent during the decade. Canadians experienced the same benefits of economic growth as residents of other developed countries, and so they responded in a similar fashion by travelling abroad.

Canadians travel abroad for many reasons. Some tourist products are not available in Canada (e.g. winter sun spots), and many Canadians perceive domestic tourism products as not competitive with those of the U.S. (in terms of price). A recent travel

price and value perceptions survey shows that Canadian respondents find prices in Canada to be much higher than in the U.S. or Europe.

As a result, the travel account had a deficit of \$3.5 billion in 1989. Most advanced industrialized countries have a travel account deficit. One sign of domestic prosperity is that citizens have the money to travel abroad. In 1989, for example, West Germany had a travel deficit of \$19.2 billion, Japan \$22.9 billion and the U.K. \$4.9 billion. The U.S. had its first surplus in travel account payments only in 1990.

International Economy is Becoming More Integrated

The world of the 1990s is far more integrated in product and capital markets, as well as in ownership linkages and technology flows. Businesses can now obtain resources from anywhere in the world and develop services and products for sale anywhere in the world.

In support of this globalization of business activity, telecommunications and distribution systems make information more accessible and vital for decision making. New technology now provides opportunities to distribute information on tourism products all over the world. Canada's use of global distribution systems to market its tourism products is limited to airlines and major hotel chains.

Airline deregulation is occurring all over the world. Increasing competition has created lower prices, more routes, greater airline capacity and, thus, more long-haul travellers. Canada must now compete with European destinations to attract U.S. international travellers.

Tourism areas and attractions in many countries are also forming alliances with airlines, travel agents, tour operators and other businesses to develop and market their products to tourists worldwide. Canada's tourism industry has yet to take full advantage of strategic partnerships.

Regional trading blocs are emerging: North America, Europe and Asia-Pacific. Governments are eliminating trade and tourism barriers and encouraging the free flow of people and goods among bloc countries. The EC, for example, is strengthening its tourism infrastructure and programming to benefit from this liberalization. Canada will need to work harder to attract tourists from other blocs.

Changing International Markets

The 1980s witnessed significant changes in tourism markets. Social and demographic shifts are affecting travel habits and the type of tourism products demanded.

Populations are changing shape in primary markets. People are living longer and healthier lives; birth rates are lower; Baby Boomers are moving into middle and older age; and two-income families have emerged.

These changes affect the desires and habits of travellers. A significant market segment of older, wealthier tourism clients now exists. They are concerned with security, safety and health, and have become discriminating and value-conscious. They are more experienced travellers with interests in cultural experiences, exotic trips, nature, outdoors and the environment. They are pressing suppliers to adapt, improve and add value.

Also, the market has fragmented into distinctive groups with specialized interests. These include off-season visitors, seniors, the weekend getaway consumer, and long-haul air travellers.

The United States

While the U.S. has remained Canada's largest single market, its dominance has declined throughout the decade. Although U.S. visits to Canada grew by 11 percent during the 1980s, visitors from overseas grew by 61 percent. Consequently, the share of international receipts from American visitors declined from 78 percent in 1985 to 59 percent in 1990.

The U.S. market is changing. The rate of population growth in the U.S. has slowed. The dominant Baby Boom generation is aging. People are migrating from the northeast to the south and west.

Consequently, the area of origin of U.S. tourists is changing. The number of tourists arriving from non-border states is up 39 percent in 1989 over 1980. Tourism from border states is down 7 percent.

The mode of transportation that U.S. visitors use is also shifting. Visitors who came by air increased 34 percent during the decade. This compares with an 8 percent increase for auto travel.

Further reflecting the U.S. population shift, points of entry to Canada are changing. There are significant increases in entry through western provinces.

Overseas Markets

Canada has benefited from changes in the European travel market. More interest in exotic destinations and stronger economies in some countries have caused Europeans to travel to Canada. Tourists from countries other than the U.S. accounted for a growing share of total international receipts through the latter half of the decade. In 1972, tourists from overseas accounted for 17 percent of international receipts. By 1990, that share had grown to 41 percent. This reflects increased arrivals and the fact that average per capita expenditures per trip by visitors from these emerging overseas markets exceeded the average for U.S. visitors by between 75 and 175 percent.

The increasing relative importance of non-U.S. markets is evident from the 1990 receipts. Some 3 million visitors from overseas accounted for \$3 billion in receipts, while 12.5 million American tourists accounted for \$4.4 billion.

Growth has not been limited to receipts. The number of overseas visitors has also grown, from 1.8 million in 1980 to 3 million in 1989.

The Asia-Pacific share of the overseas market is also increasing. In 1980, 16.8 percent of international visitors came from that region. In 1990, the share was 28.8 percent, primarily from Japan. This reflects the Japanese government's *10 million visitors policy* to help its people become more aware of other cultures.

Canada

The Canadian outbound market is also shifting. Overseas destinations are changing from Europe and the Caribbean to Asia and South and Central America, particularly Mexico.

More Canadians are travelling to the U.S. by car. Air and bus travel have dropped. Travel for recreation has increased over other trip types. More Canadians are travelling to the U.S. from Ontario, the Atlantic provinces and Manitoba. This likely reflects the growth in cross-border shopping.

International Competition is Increasing

More countries have recognized that tourism generates foreign exchange. It is also valuable as a tool for economic development, since it creates low- and high-skill jobs and capitalizes on a country's natural resources.

As a result, new competitors for international tourism receipts are entering the arena. Hong Kong had a promotional budget of \$25.7 million in 1989. Thailand devoted \$16.7 million to promoting its tourist attractions during that same year.

At the same time, Canada's traditional competitors are spending more to attract international tourists. Promotional spending in the U.K. has grown by 11.5 percent since 1986, and by 14.2 percent in West Germany. Australia's promotional budget alone has grown by 20 percent, to \$51 million in 1990.

Competition is also strengthening within North America. The U.S. federal promotional budget has grown by 7 percent a year since 1986. In addition, total spending by individual states has grown by 16.4 percent, on average. New York's budget grew by 6 percent, while the Illinois and Pennsylvania budgets each grew by 17 percent.

Mexico spent \$69 million in 1990 for marketing. Of this total, \$46 million was targeted at the U.S.

The federal government's annual international marketing budget, by comparison, was \$25 million in 1990. Seventy percent of this was targeted at the U.S. The national programs are complemented by multi-year regional tourism initiatives and agreements. These include: the Southern Ontario International Tourism Marketing Initiative (\$4.6 million), the Canada-Atlantic Provinces Cooperation Agreement on International Tourism Marketing (\$10 million), the Canada-Newfoundland Cooperation Agreement on Tourism and Historic Resources (\$20 million). In addition, private-sector funding is levered through partnership agreements. The provincial governments spend a further \$49 million on marketing, 83 percent of which is devoted to the U.S. market.

Against a background of reduced growth, the Canadian tourism industry has faced intensified competition for the international tourist through the latter half of the decade.

Strengths and Weaknesses

Strengths

Reputation

Canada, as an international destination, is known for beautiful scenery, wide open spaces and a clean environment. It has modern infrastructure and good transportation facilities. It is also noted for its easy accessibility, comfort, security, stable political climate and friendliness.

Canada is recognized for its cultural diversity. It has both French and British heritage, a unique native culture and the multicultural mosaic of its large urban centres.

Products

Canada has a wide variety of internationally competitive tourism products. They include the following:

- **Touring**
 - well-established touring corridors from Windsor to Quebec City; through the Rocky Mountains; and along the lower mainland of B.C.
 - theme tours and itineraries through the Maritimes and along the Yellowhead Highway and the Viking Trail.
- **Outdoors**
 - specialty products such as skiing, hunting and fishing, and wilderness adventure trips.
 - a network of national and provincial parks.
- **Cities**
 - international gateway cities of Montreal, Toronto and Vancouver, an attractive national capital and other appealing urban experiences in smaller cities.
- **Resorts**
 - resort destinations in many regions of Canada such as the Rockies, the Muskokas, Kananaskis and the Laurentians, and other facilities closer to urban centres.

Location

Canada is close to the most important market in the world. It also occupies a strategic location as a gateway to the North American market.

Price-Value Perception

Canada is an established presence in the primary tourist markets of the world. It is an effective competitor in the U.S. market. Americans perceive Canada as a travel destination that offers a high-quality product for prices that compare with those of similar products in other countries. A study of travel price-value perceptions reveals that 88 percent of U.S. visitors are likely to recommend Canada as a pleasure trip destination to friends and family.

Canada has also succeeded in attracting more overseas visitors from Western Europe and Asia. Western Europe accounts for almost half of global spending on personal travel.

Weaknesses

Market Intelligence

A great deal of market information is collected by the sector, although it is not always well publicized and distributed. But little analysis is performed to understand the market, competitors' activities and the need for product development. This is especially true for smaller operators. Given the segmentation of the market and the increasing sophistication of the customer, a poor understanding of market demand and its product implications is a competitive disadvantage.

Infrastructure

Not all of the sector's facilities are of a standard capable of delivering the quality of product in demand in today's competitive environment. Toronto and Vancouver, Canada's two most important air transportation hubs, are prone to serious runway congestion.

The reduction in Canada's passenger rail services has made access to the most scenic areas more difficult. Private-sector initiatives have not succeeded in overcoming this difficulty. Intercity rail services are poor. In addition, Canada's national highway system needs improvement. Much of the Trans-Canada Highway is two lanes and as a result is subject to traffic congestion.

Over the past decade, private sector investment in accommodation has grown. From 1982 to 1989, capital expenditures for accommodation went from \$430 million to \$825 million annually. As a result, new capacity exists in this sector. These investments have increased capacity in resort areas and budget downtown hotels. However, this mix of accommodation products may not meet the needs of changing tourism markets.

Many of Canada's major tourist attractions are publicly funded. These include: museums, galleries, centres for the performing arts, heritage and historical sites, park interpretation centres, aquaria, recreational harbours and marinas. These attractions have been subject to budgetary restrictions as governments have sought to control deficits. Consequently, funding may not be available to develop them to a level attractive to tourists.

Price

Over the past decade, travel prices increased on average by 6.8 percent per annum. Along with these internal cost pressures, the appreciation of the Canadian dollar against the U.S. dollar since 1985 has served to raise the price of Canadian tourism products in the U.S. market. This has fed the perception that Canada is a high-price tourist destination, even though prices are below those of many of Canada's competitors in Europe and Japan.

Product Packaging

In the face of market fragmentation, the sector has not been creative in packaging its products. For example, it has been slow to respond with packages to attract the weekend *getaway* consumer. It has failed to develop sufficient packages for off-season visitors, or the business-pleasure traveller.

Market Access

Transportation lies at the heart of market access, especially air transportation. The shift in the American population away from bordering states has increased the importance of air transportation links. The present Canada-U.S. Air Services Agreement severely limits transborder air services, especially between Canada and states in the U.S. with rapid population growth. Negotiations to overcome this structural weakness are already underway with the U.S. government.

The past decade has witnessed important changes in the domestic air transportation industry. Yet, despite the move to privatization of Air Canada and the mergers that led to the founding of Canadian Airlines International, neither carrier is well placed to compete in a more liberalized world trading environment.

Technology

Data for 1988 show that the Canadian tourism industry has not adopted tourism-related technologies as quickly as its international competitors. This is especially true for small and medium-sized enterprises in the hospitality, food and beverages, and events and attractions sectors. This has hindered productivity gains for the sector.

In addition, the sector has not been successful in using the latest networking, information storage and retrieval techniques to ensure its products are on-line and accessible to travel agencies and sales representatives around the world.

Human Resources

More than any other industry, tourism depends on people. People can make the difference between a good vacation and a poor one. The attitudes and skills of the work force often compensate for slight product deficiencies.

The tourism industry in Canada is already experiencing shortages of skilled workers in resorts and larger cities. At the same time, the level of education and training in the industry is well below that in other industries. The situation is particularly serious at the supervisory and management levels. The net result is an industry characterized by many entry-level, low-wage jobs, high turnover rates and poor productivity. Industry-set standards, peer recognition of professional qualifications through certification, and ongoing training are essential if the industry is to meet the challenges of providing quality service to an increasingly sophisticated and mobile clientele.

Cost of doing business

The costs of government legislation and regulation for social, health, safety and equity objectives are borne, in part, by the private sector. They add to the cost of doing business. This is the case for most OECD countries, including Canada.

In Canada, high interest rates, the appreciation of the dollar against the U.S. dollar, provincial procurement policies and other interprovincial barriers to trade, and U.I. premiums are the costs typically quoted by businesses. The high levels of taxation of important inputs such as fuel, alcohol and accommodation, and the impact of the GST on price perceptions, are added concerns of the tourism industry. Special features have been incorporated, notably the Visitor Rebate Program, to respond to industry concerns about the GST.

Financing

Despite its economic importance, the tourism sector often has difficulty attracting debt or equity financing. This is largely attributable to the nature of the sector itself. The sector is characterized by small operators who have limited knowledge of business and financial planning; this hinders their ability to attract financing and increases their lack of awareness of alternative sources of financing. This is most acute for start-up businesses, which are viewed as high-risk ventures by financial institutions.

Outlook for the 1990s

The international tourism market is not projected to grow as fast as it has in the past. The World Tourism Organization's most optimistic forecast estimates that international tourist arrivals will grow by 4 percent per year through the 1990s.

In line with these forecasts, annual growth in the number of U.S. visitors to Canada is also projected to be modest by past standards, about 1.3 percent over the next five years.

The growth in non-U.S. markets is expected to be more robust, especially France (6 percent), and Japan (5.6 percent). However, only modest growth is projected for the U.K. (0.7 percent), and no growth for West Germany. International receipts are also expected to grow less rapidly than in the past, at 4.9 percent per annum during the same period.

Different factors come into play in these forecasts. Canada, the U.S. and the U.K. are recovering from a recession. The exchange rate between Canada and the U.S. is significantly less favourable to U.S. tourists than it was a few years ago. Several international events will take place in Europe in 1992 that will increase competition. West Germany, even with

good economic conditions, has an enlarged population more preoccupied with its domestic situation than with international travel.

Nonetheless, opportunities do exist for Canada's tourism products in Western Europe and in the Asia-Pacific region. Market research indicates that the U.K., France, West Germany and Japan are four international markets that show great promise for Canada. Long-haul travel is expected to grow faster than intra-European travel. Further, interest in long international trips in this market has about doubled during the past three years. In West Germany, the incidence has more than doubled from 9 percent to 24 percent.

Furthermore, Canada's competitive advantage will grow in an increasingly environmentally sensitive world.

Maintaining or increasing its share of global receipts represents a significant challenge for the Canadian industry in an environment characterized by slowing demand, rapidly changing international tourism markets and intensifying competition. It is only through collective and individual action, based on a common understanding of the issues, challenges and opportunities that the tourism industry will succeed.

A Sectoral Agenda for International Competitiveness

Understanding the Markets

- To understand the tourism market, the industry must undertake research analysis. The industry needs to research travellers' experiences, products sought and potential for visitation within Canada. Cataloguing and assessing internationally competitive products is also key, along with gaining knowledge about the international economic and business developments that may affect tourism.
- To understand the tourism market, the industry must encourage the federal government to provide information to industry. Industry associations can play an important role in analyzing, publicizing and distributing information to smaller operators. The federal government can assist by providing timely, analytical information as a business service to the industry through reports, seminars, and workshops that assist planning and decision making.

Developing the Right Products

- The product: the tourism industry needs to continue taking advantage of opportunities to develop and upgrade Canada's primary product lines (to meet customer demands); to further package Canadian experiences to create satisfied customers; and to provide value for the right price.
- Human resource development: excellent service will generate return visits and word-of-mouth advertising. The skill, knowledge, attitude and efficiency of industry employees determines the level of service. The industry needs to continue upgrading its management skills and the skills of its employees.
- Transportation: the federal and provincial governments are working to ensure that transportation deficiencies do not hinder market access. For example, the federal government will negotiate a new bilateral air services agreement with the U.S. to improve transborder air services and provide greater access to the most lucrative tourist markets in the world. The tourism industry needs to take advantage of new opportunities and to work with the transportation industry to attract more tourists.
- Sustainable development: the tourism industry and the tourism research community need to work with other industry sectors to protect and upgrade

Canada's tourism product — the environment. The tourism industry must also develop principles and codes of practice to guide the development of the tourism industry while preserving Canada's reputation for possessing a clean, unspoiled and uncrowded environment.

- Financing: the tourism industry and the financial institutions need to work together to assist the industry in becoming better acquainted with business practices and financial planning to improve the prospects of securing financing.
- Business climate: the tourism industry needs to work with federal, provincial and territorial governments to examine ways of reducing the cost of doing business in Canada, including an investigation of levels of taxation, incentives for innovation, and interprovincial barriers to trade.

Selling the Product

- Marketing: the sector needs to market its products more aggressively to close the sale. The federal government is willing to help by raising the awareness of Canada in potential market segments.
- Reaching the customer: the tourism industry needs to develop partnerships to establish distribution networks that respond to identified customer needs.

**INTERNATIONAL
COMPETITIVENESS:
An Agenda for the 1990s**

IN CHAPTER II THE COMPETITIVE PROSPECTS OF 16 MAJOR CANADIAN INDUSTRIAL sectors are assessed, relative to their U.S. and overseas competition, in terms of productivity performance, cost competitiveness, and success in domestic and international markets. The general conclusion that emerges is, although on the whole our industrial competitiveness ranks high internationally, it has declined in the 1980s relative to our major competitors and to our past performance.

The weak productivity performance of many Canadian industries in the 1980s is a serious cause for concern. Furthermore, there is a general consensus that the international competition facing Canadian industries in both domestic and international markets will be even greater in the 1990s.

Finally, the sectoral papers attempt to identify those elements of the competitiveness equation that the major stakeholders — industry, labour, educational institutions and governments, individually and in partnership — need to strengthen in order to ensure the kind of competitive performance required if our industries are to succeed in the 1990s. The results of the sectoral competitiveness assessments confirm the importance of the key elements of Canada's future prosperity as identified in the discussion paper: *Prosperity Through Competitiveness*. They also underline the great benefits to be derived from the increased willingness of Canadians to work together in a wide range of partnerships.

This chapter summarizes the major factors identified in the sectoral analyses as being particularly important influences on the international competitiveness of Canadian industries.

Major Factors Affecting International Competitiveness

A review of the 16 sectoral assessments makes it abundantly clear that there are myriad factors influencing industrial competitiveness. They include the production efficiencies of Canadian enterprises, access to natural resources, access to competitively priced inputs to production processes, efficient transportation, telecommunication and distribution infrastructures, access to domestic and international markets, utilization of best-practice and leading-edge

technologies, the availability of a flexible and highly skilled work force, the innovative and strategic capabilities of Canadian enterprises, and a macroeconomic environment conducive to competitiveness.

Canada's Domestic Market Base and Industrial Structure

Three broad fundamental issues emerge from the sectoral assessments as major influences on Canada's industrial structure and competitiveness: the relatively small size of Canada's domestic market; Canada's rich natural resource endowments; and the dramatic change in Canada's industrial structure as a result of the growth of the service industries.

- The relatively small size of Canada's domestic market continues to have a profound impact on the competitiveness of Canadian enterprises and on the nature of Canada's industrial landscape.
- In general, firms in the resource-processing and manufacturing sectors have been unable to achieve the economies of scale necessary to be internationally competitive while serving only the domestic market.
- Those industries that have remained domestic-market oriented have, for the most part, failed to achieve an internationally competitive standard.
- In this context, the most successful Canadian enterprises have pursued strategies based on production geared to serve international markets; product specialization to serve North American or international markets; and the development of goods and services to serve global niche markets.
- Access to Canada's rich natural resource base has given rise to the growth and development of large, internationally competitive resource processing industries.

- Canada's primary processing industries (e.g. commodity-type forestry and chemical products and non-ferrous primary metals) tend to be world-scale and export oriented.
- However, as one moves up the value-added chain to highly fabricated, high-value-added resource-based products, there is a general concern that production is domestic-market oriented, economies of scale are not being achieved, and export orientation and competitiveness decline.
- The phenomenally rapid growth of the service sector, to the point where it now accounts for over 70 percent of employment in the economy, is the other fundamental factor affecting Canada's industrial structure and competitiveness.
- The growth of the service sector has been driven by the rapid growth of producer services (services sold to other industrial firms as opposed to consumer and government services) and is related closely to fundamental changes taking place in all the industrial economies whereby industrial processes are increasingly services and information intensive.
- Services are playing an increasingly important role in international trade and as inputs into the development, production and distribution of goods. Many government services are also, directly or indirectly, producer services (e.g. education, training and health services).
- Effective linkages between services and goods producing industries and enterprises are critical to the competitiveness of Canadian industries.

The International Orientation of Canadian Industry

A large number of Canadian industries within the sectors analyzed are export oriented. In addition to the large natural resource processors, other export-oriented industries include urban transit equipment, telecommunications equipment, industrial equipment, aeronautics and automotive. Even within the traditionally domestic-market-oriented sectors such as food, furniture and electrical products, some strongly export-oriented industries are identified. On the other hand, a large number of industries in the capital goods, consumer goods, fabricated materials and services sectors are identified as industries that need to specialize further and become more export

oriented or outward looking if they are to survive in the highly competitive environment of the 1990s.

Major factors affecting the export orientation of Canadian firms and industries include the following:

- Globalization of trade and investment activities, facilitated by the liberalization of trade and investment and by technological advances in transportation and telecommunications, is affecting Canadian industry profoundly.
- Multinational corporations are not only dominating world trade but are also undertaking a broad variety of production-related activities in a growing number of national markets either directly or via alliances and joint ventures with foreign corporations.
- The global competitive environment is getting tougher due to the entry of new competitors from formerly domestic-oriented countries — challenging Canadian industries in both domestic and export markets. Attempts by national governments to limit such new competition have often backfired by providing new competitors with incentives to move into high-value-added products, markets that many Canadian firms are targeting for the 1990s.
- Large foreign corporations, particularly of European and Asian origin, have established a presence in Canada in recent years via either direct investments or cooperative ventures with domestic corporations; bringing with them new technologies and ways of doing business, improved access to foreign markets, and a strengthened domestic competitive environment.
- Trade liberalization, multilaterally and bilaterally, provides Canadian enterprises with freer access to the large North American and global markets as well as with broader options for pursuing corporate strategies based on the penetration of wider markets, specialization in production, and the pursuit of global niche markets.
- The extreme orientation of Canadian exports toward the U.S. market is confirmed at the sectoral level, with very few exceptions. For formerly domestic-market-oriented industries seeking an export-market focus, an initial U.S. market concentration often makes sense. However, for a number of Canada's more mature export-oriented industries, greater efforts must be made to access overseas markets in order to maintain or increase current output levels.

- Protectionist policy approaches clearly would have limited the growth of the Canadian economy and our standard of living, because for many products the Canadian market is too small to achieve needed economies of scale and the technological advances that meet international standards of competitiveness. In addition, protectionist options limit severely the competitive environment and incentive to innovate.
- Although great progress has been made in lowering tariffs multilaterally and under the FTA, Canadian industries generally retain an interest in ensuring that Most-Favoured-Nation tariffs on production inputs are not significantly higher than U.S. tariffs, that the Canadian tariff on intermediate products is lower than on final products, and that foreign tariffs on more highly fabricated products are negotiated down to the greatest extent possible.
- Although trade liberalization agreements have resulted in significant reductions in tariff barriers, non-tariff barriers continue to represent a significant problem for Canadian firms both with respect to the U.S. market and even more so with respect to overseas markets.
- Foreign government support for export financing as a source of competitive disadvantage is a major issue for a number of Canada's more successful export-oriented industries. The multilateral negotiation of limitations on these export subsidies and on their spread to other sectors is clearly in Canada's interest, but in the interim, Canada must continue to maintain an export finance support program that is as competitive as possible.

Corporate Strategies in a Global Environment

The corporate strategies being pursued in the different industrial sectors in the face of globalization and growing international competitive pressures are discussed at length in the sectoral analyses. An emphasis on the need to specialize and export, and to identify and to pursue global market niches is pervasive. These strategies are consistent with globalization pressures that are making it increasingly difficult for Canadian industries to maintain a presence in the production of standardized, mass-produced products or of highly labour-intensive products now being produced in the low-wage countries and exported

to developed-country markets. Also consistent with these trends, is the need identified in most of the sectoral analyses for a greater industrial focus on the production of more sophisticated, highly fabricated and high-value-added goods and services. In these areas, economies of scale give way in importance to technological expertise, economies of scope, highly skilled labour inputs, and knowledge of sophisticated markets and market needs.

Major factors identified in the sectoral perspectives that affect the corporate strategies of Canadian firms in an increasingly globalized environment include the following:

- Canadian industries are often characterized by a large proportion of small and medium-sized firms than is the case in counterpart industries in countries enjoying the benefits of a large domestic market. Even the large firms in Canadian industries tend to be dwarfed by U.S., European and Japanese competitors.
- An advantage held by small enterprises is their flexibility, market responsiveness and ability to produce customized goods and services — capabilities that modern markets value highly. On the other hand, with the exception of the export-oriented services firms, small and medium-sized enterprises tend to be domestic-market oriented relative to larger firms in the same industry.
- The great benefits of linkages to a sophisticated and demanding customer base are well illustrated in the sectoral analyses (e.g. linkage between the electrical utilities and electrical products industries, between telecommunications firms and suppliers, and between municipal transit authorities and urban transit equipment suppliers).
- The need for Canadian enterprises, large and small, to develop beneficial links to suppliers, customers, international competitors, information networks, and educational and technological centres of excellence, is stressed heavily in the analyses.
- Weak linkages between the users of machinery and equipment and their suppliers is identified as a source of competitive disadvantage for both consumer and supplier industries in Canada. Economies of scale dictate that Canadian capital-goods industries be highly rationalized, so user industries must often purchase their machinery and equipment abroad, raising the cost of such

machinery and limiting opportunities for the kinds of fruitful supplier-customer linkages that would develop if users had access to local suppliers.

- The sectoral analyses place a heavy emphasis on the need for more strategic industrial alliances and partnerships involving machinery suppliers and users; parts suppliers and assemblers; small and medium-sized firms in pursuit of international markets or technological developments; and between industrial enterprises and centres of excellence.
- A trend in modern markets to demand packages of goods and services places a high value on *solution selling* — a phenomenon that reinforces the need for linkages among industrial firms.
- The important role that foreign-owned Canadian enterprises play in a large number of industries is confirmed. These subsidiaries bring new investments and technologies into Canadian industries and in many cases produce intermediate or final products that would otherwise not be produced in Canada.
- The role of foreign-owned subsidiaries in Canadian industries is identified as being considerably more positive in some sectors than in others in respect of their contribution to the economy. The viability of traditional highly diversified branch plants, with limited capabilities in areas such as design, product development, and marketing is becoming more and more questionable in an increasing globally integrated environment.
- Foreign-owned subsidiaries in Canada are experiencing the same pressures as Canadian-owned firms — if they are to survive they will need to specialize and seek export markets. The major challenge they face is to secure North American or world product mandates for themselves.
- A number of Canada's major export-oriented industries appear to be well positioned in relation to those international markets expected to experience rapid growth in the future (e.g. industries within the natural resource processing and products sectors, civil aeronautics, urban transit, information technologies and business services).
- On the other hand, market growth prospects in the tourism, automotive and several consumer products sectors, are not as good for the 1990s.
- Attempts by Canadian industries to move into high-value-added products will be bolstered by the

fact that international trade in high-value-added products is growing faster than trade in commodity type products.

- As detailed in the sectoral analyses, Canadian industries in the 1990s will have to increase their participation in new growth areas such as biotechnology and information-technology-based products, environmental products and services, and products using new materials.
- Canadian industrial enterprises clearly need to have good access to the financial resources required to finance their future growth and competitiveness. High capital costs and difficulties in accessing capital have a particularly negative effect on investment decisions involving long payback periods. They affect small and medium-sized corporations more than large corporations (who have better access to international capital markets) and Canadian more than foreign-owned enterprises.
- Finally, a need to improve the industrial relations climate in the 1990s is stressed in a number of the sectoral perspectives. A great deal of the new competition on the global scene is from low-wage, foreign competitors. Canadian management and labour must work together to overcome the wage-cost advantages of these competitors by moving into high-value-added products that are less labour intensive, and by raising productivity as a means of keeping overall costs competitive.
- The potentially great benefits of cooperation between labour and management through developing a more flexible work environment and innovative approaches to facilitating the introduction of new technologies, organizational innovations, and effective training approaches for human resource development, is highlighted in the sectoral perspectives.

Human Resource Development

In recent years there has been a growing appreciation of the fundamental importance of human resources for industrial competitiveness. The long overdue recognition of the vital role played by a highly skilled and educated work force is an extremely positive development for Canada because, despite the problems discussed below, Canada possesses a skilled and educated work force, which represents a source of Canadian competitive advantage.

Common challenges in the education and training fields identified in the sectoral perspectives include the following:

- Skills requirements have been rising very rapidly in both the services and manufacturing sectors due to broadly defined technological advances. The growing complexity and sophistication of production and distribution systems is raising requirements for knowledgeable workers, highly specialized professionals, and highly skilled technical workers.
- The rapid escalation of requirements for better-educated and higher-skilled employees has resulted in actual or potential demands in excess of the supply of such employees.
- Demands are increasing for more highly literate workers with good abilities to work with numbers, data and information, and for workers with more highly developed analytical and conceptual skills.
- Industry is finding that the educational systems at the primary and secondary levels are not producing graduates with the requisite skills levels in these areas.
- Reliance on immigration as a source of highly skilled technical workers, particularly for highly skilled technicians at the shop floor level, is becoming increasingly difficult as demand and rates of compensation for these technical personnel in their home countries are increasing. As a result, skills gaps in these areas are becoming a real problem, compounded by the lack of effective training infrastructures and apprenticeship systems in Canada.
- At the university and post-graduate levels, the problems identified relate primarily to the outlook for the supply of graduates in the natural sciences (e.g. engineers, chemists and biologists) in the 1990s. There also is a concern on the part of industry that graduates in these areas and in the social sciences disciplines should be more highly specialized in areas of particular interest to the industries in question.
- In virtually all of the sectoral analyses, the need is identified for a significantly greater investment in training and skills development on the part of Canadian industries. There is a growing appreciation of the vital importance of a highly skilled work force in the competitiveness equation and of the need to train and retrain employees over

time in the face of rapid technological advances and changing corporate strategies.

- Valuable human resource development initiatives, at the sectoral level, either underway or planned, are identified that involve industry and labour in joint efforts to provide more effective on-the-job training and, in concert with training institutions and governments, to develop customized training approaches and courses.
- Given the continued rapid rate of technological advance, demands for highly skilled workers are expected to rise very sharply in the 1990s.
- Finally, the trends in corporate and industrial strategies identified above, as well as the increasingly competitive environment forecast for the coming decade, will place heavy demands on Canadian management and require a broader range of management skills and expertise in areas such as strategic planning, technological development and international marketing.

Innovation and Technological Development

The ability to innovate is key to the development and maintenance of internationally competitive Canadian enterprises. Therefore, the low R&D intensities of Canadian firms and industries compared to their major international competition is a cause for concern. Weak investment in R&D on the part of Canadian firms is ascribed to the tendency of foreign subsidiaries to import technology from parent corporations, the small size of Canadian firms relative to the high levels of investment required to undertake R&D in many areas, a lack of capacity and the human resources in many firms to work with new technologies, a focus on commodity-type production as opposed to high-value-added production, and a focus on investments with short payback periods. Even the ability to utilize effectively Canada's S&T base—universities and technology centres is weakened by low levels of investment in innovation and R&D on the part of industry.

The major factors influencing the innovative capabilities of firms in major Canadian industrial sectors include the following:

- The R&D intensities of Canadian firms, whether domestic or foreign owned, are, with very few exceptions, considerably lower than that of their major foreign competitors.

- In general, the R&D intensities of Canadian subsidiaries tend to be lower than those of Canadian-owned firms, although the opposite is true in several industries. On the other hand, subsidiaries import technologies as well as product, process, and organizational innovations. These activities have been shown to give rise to spillovers and thus benefit Canadian industries more generally.
- Many subsidiaries undertake R&D in order to customize products to Canadian markets, increase their ability to utilize imported technologies most effectively, and support product mandates. Canadian subsidiaries with R&D capabilities are better placed to make a more significant contribution to the Canadian economy by developing and maintaining North American and world product mandates.
- Canadian industrial R&D is focused particularly on the developmental side of the R&D spectrum. Basic and fundamental research in Canada is undertaken in universities, government research labs and other centres of excellence. The need to strengthen links between industry and centres of technological excellence in Canada and abroad is identified in a number of the analyses.
- The lack of R&D capabilities in small and medium-sized firms is identified as a barrier to the transfer of technology and diffusion of innovations. The sectoral analyses identify a need for Canadian firms to enter into R&D consortia linked to centres of excellence to promote the development and transfer of new technologies to Canadian industries.
- As a general rule, Canadian innovation strengths are found more in product than in process innovation. This is consistent with corporate strategies based on specialization, the production of customized goods and services, and the development of products for global niche markets.
- Major process innovations are significantly more costly than product innovation and the small size of Canadian firms relative to their foreign competitors makes it more difficult for Canadian firms to invest in such innovations. However, a number of the sectoral assessments stress the need for a concerted effort to strengthen Canadian capabilities in process innovation. Price is expected to become an increasingly important factor in maintaining market shares even in global niche markets.
- Organizational innovation is also stressed in a number of the sectoral perspectives. Significant productivity gains can be reaped from innovations on the shop floor coupled with more effective linkages to suppliers and customers who are becoming extended parts of modern production chains.
- A comprehensive and effective organizational innovation, Total Quality Management, is mentioned explicitly or implicitly in a number of the sectoral perspectives. Total Quality Management means the aligning of all aspects of the organization in an orientation toward the customer. It includes new approaches to worker involvement in the management of production and other processes and the empowerment of workers to take on greater responsibility for achieving objectives. Such approaches can enrich job content and raise worker motivation.
- Also, Total Quality Management can lead to significant productivity gains in a number of ways, through the reorganization of production processes and work flows, reduction of waste, better linkage of processes to downstream and upstream activities such as design, distribution and marketing, better inventory control (Just-In-Time manufacturing), more effective partnerships with suppliers and customers, and the elimination of inputs that do not add value to the product. The result is higher quality products that will be more highly valued by customers.
- The slow rate of diffusion of product, process and organizational innovations is noted in a number of the sectoral analyses. Initiatives to encourage technology transfer, strengthen R&D networks, and encourage the better diffusion of technological intelligence can all help to promote the diffusion of innovations. New foreign investments in Canadian industries also contribute to a heightened awareness of innovations and technological developments.
- Rates of diffusion of innovations are influenced greatly by the strength of competitive pressures facing firms and their capability to make the investments in technology and skilled human resources necessary to innovate. The increasing intensity of international competition should result in more rapid rates of diffusion, particularly in industries that in the past have been somewhat insulated from international competitive pressures.

- A number of new and powerful generic technologies are either affecting the competitiveness of a broad range of Canadian industries today, or are expected to do so in the course of the 1990s. Information technologies and advanced manufacturing technologies are already being utilized in Canadian industries, though their rates of diffusion may be less than satisfactory.
- Because computer integrated manufacturing technologies have the potential to reduce the importance of economies of scale as a major influence on industrial competitiveness, the payoff to the development, customization and utilization of these technologies may be particularly great in a number of Canadian industries.
- In many sectors the need is identified for industry to become more involved in the development or application of environmental technologies, biotechnologies, emerging electrotechnologies, ocean industries technologies, and advanced industrial materials. Many of the products of the future will be generated by these technologies and it is vitally important that Canadian research institutes and Canadian firms become conversant with them on both the R&D and applications sides.
- Canada's commitment to sustainable development has very significant implications for Canadian industries. Global concerns over the environment ensure that the market for environmental technologies, services and equipment will be one of the fastest growing markets internationally. At the same time, as noted in the sectoral papers, environmental concerns are having significant impacts on the demand side as well, as consumers demand more environmentally friendly products. Both these developments represent real areas of opportunity for Canadian industries via the international marketing of Canadian environmental technologies, expertise and environmentally friendly products.
- The relatively generous tax treatment afforded R&D investments and expenditures in Canada is noted in several of the sectoral assessments as an incentive to undertake R&D and a source of competitive advantage for Canadian enterprises. In the light of rapid technological advances and changing industrial structures, the federal government has reviewed and clarified the definition of eligible capital assets for purposes of determining R&D

tax credits. However, as illustrated in the sectoral analyses, there is scope for industry and government to work together to clarify the applicability of the rules to specific R&D activities and to ensure industry is fully aware of the R&D tax incentives.

- On an even broader level, the profound changes occurring in Canadian industry as detailed above — the rapid growth of the services sector and the changing nature of production processes, the need to encourage high-value-added production, the growing importance of human and information capital, and major impacts arising from the development of the new generic technologies — appear to call for significantly increased investments in intangible capital as well as in physical capital.

Governments' Influence on the Competitive Environment

Governments have profound influence on the competitiveness of national industries because they determine the economic and social environment in which industry operates. The broad role of governments in influencing the competitive environment is addressed in the consultation document *Prosperity Through Competitiveness*. However, the sectoral competitiveness assessments highlight a number of specific areas where governments have had a major impact on competitiveness in specific industries in the 1980s:

- At the macroeconomic level, the Government of Canada has established policies that reinforce the Canadian market economy. Chief among these have been income tax reform, the liberalization of international trade and investment, the replacement of the Manufacturers' Sales Tax by the Goods and Services Tax, and regulatory reforms in important areas such as transportation, communications, and financial services.
- The sectoral competitiveness assessments identify the need for a stable macroeconomic environment, with low inflation and interest rates, and exchange rates that reflect the competitive position of the Canadian economy. Price stability, increased productivity and lower government demands on financial markets will contribute to lower interest rates and ease pressures on the dollar. But, Canada cannot secure a higher standard of living in the next decade on the basis of a depreciating exchange

rate — it must rely on significantly improved productivity and international competitiveness.

- At the sectoral level, there remain areas where government regulations need to be reviewed to ensure they provide as much scope as possible for markets to work effectively, and are designed to be as supportive as possible of the competitive needs of Canadian industries, consistent with regulatory objectives.
- Governments have a number of regulatory issues on their policy agenda, including important issues such as the need to develop a second generation supply management regime to ensure that Canada's food processing industries have access to competitively priced raw materials inputs required to be internationally competitive.
- Environmental issues are raised in the majority of the sectoral competitiveness assessments. Regulations to protect the environment can impact industrial competitiveness negatively if costs of compliance raise production costs steeply relative to the costs being imposed on competitive enterprises abroad. Thus designing efficient environmental regulations remains a major challenge for Canadian governments in the 1990s. On the other hand, as pointed out in the sectoral papers, forward-looking and well-designed regulations can be a source of competitive advantage by providing domestic firms with strong incentives to develop new technologies and products for domestic and international markets.
- The need to make greater progress in respect of the harmonization of standards both domestically and internationally, and in particular between Canada and the U.S., is raised as an important issue for industrial competitiveness in a number of the sector analyses.
- Finally, the persistence of interprovincial barriers to trade, investment and the mobility of labour poses a very real barrier to the achievement of international competitiveness in a surprisingly large number of Canadian industries in the resource processing, manufacturing, construction and services industries. Given the structural characteristics of the Canadian economy (discussed above), barriers within the domestic economy that fragment

markets, encourage a proliferation of small plants incapable of achieving economies of scale, prevent needed industrial rationalization, discourage innovation, and raise prices and costs for consumers and downstream producers, are in sum and substance wholly contrary to the achievement of an internationally competitive economy.

An International Competitiveness Agenda for the 1990s

The principal message that emerges from an assessment of Canada's manufacturing, services and tourism industries is that we are entering a decade in which Canadian industries will be challenged as never before in both domestic and export markets. If a prosperous future is to be secured for ourselves and future generations of Canadians, these challenges must be met. The sectoral assessments suggest that to meet these challenges and improve industrial productivity performance, intensive efforts will be required to strengthen the international orientation of Canadian industries, build a highly skilled work force, enhance innovative capabilities, build effective industrial linkages and partnerships, and strengthen the Canadian market economy. A more competitive economy will be key to improving our standard of living, and creating more rewarding jobs and a better environment and quality of life for all Canadians in the 1990s.

Strengthening the International Orientation of Canadian Industries

The major challenge facing Canadian business enterprises in the 1990s is to develop and implement global strategies that will position them to become more active participants in the globalization process that is affecting virtually all Canadian industries. Successful enterprises are increasing their international orientations and are increasingly active participants in international markets via exports, direct investments, international joint ventures, technology prospecting, and international market monitoring.

Canada's small and medium-sized enterprises are being challenged to sharpen their marketing skills, develop an initial export orientation or expand their

international market horizons. Small and medium-sized enterprises, particularly neophyte exporters, must strive to capture the benefits of the FTA and the prospective North American Free Trade Agreement, to participate in the federal government's Going Global initiative, and to utilize effectively government export market information and development programs.

The greatest challenge facing the Government of Canada in the international arena will be to continue to pursue with vigour its efforts to secure even more open international market access for Canadian industry. Although significant progress has been made multilaterally and bilaterally in reducing tariff barriers, there remains room for further progress and a broad and daunting array of non-tariff barriers continue to impede competitive access for Canadian enterprises to the U.S. and, to an even greater extent, overseas markets.

Building a Highly Skilled and Adaptable Work Force

The Canadian economy is evolving rapidly into an information and knowledge-based economy. The development and utilization of human and information capital is vital to the achievement of a stronger competitive performance on the part of Canadian industry. Canadian industry increasingly requires a work force with high numeracy and literacy skills, with abilities to work with data and information, and with good analytical and conceptual skills. The trend toward the production of high-quality, high-value-added and ever more sophisticated products to serve global markets requires specialized scientists and engineers to develop new products and production systems, strong design capabilities, strong technical expertise on the plant floor, and expertise in international marketing.

The maintenance of competitive Canadian industries in the 1990s will require a significant increase in investments in training to raise the skills levels of employees. Industry and labour need to work more closely with the commercial training sector and community colleges to ensure the development of customized training courses and techniques most appropriate to the needs of industry, which in many cases will contain a strong element of on-the-job training.

Industry also needs to collaborate even more closely with centres of advanced learning to ensure university graduates have the relevant specializations in the natural and social sciences (e.g. specialized engineers and scientists, and internationally oriented management school graduates).

Industry, government and labour need to work more closely, not only to ensure that industry is using effectively government-labour market development programs, but also to encourage industry and labour to better diagnose training and skills requirements and identify and remedy weaknesses in training infrastructures (e.g. the need for more effective apprenticeship programs).

Finally, there is a need for a significant improvement in the abilities of the basic educational systems, primary and secondary, to graduate a higher proportion of students and to produce graduates capable of meeting higher standards in relation to numeracy, literacy and conceptual skills.

Enhancing Innovative Capabilities

The prospects for more successful, competitive, export-oriented industries will be strengthened as Canadian enterprises further specialize their production, develop more highly fabricated and high-value-added products, and develop new products for global niche markets. The challenge facing both domestic and foreign-owned Canadian firms will be to sharpen their design and product development skills, significantly increase their investment in R&D and strengthen their expertise in adapting and applying new technologies.

Many of the products of the future will be based on the new generic technologies discussed above. Canadian firms that become more conversant with these technologies will be able to take advantage of strong international market demands for the technologies and the products in which they are embodied.

In the fiercely competitive international environment of the 1990s strengthened capabilities in the process and organizational innovation fields will be vitally important. International cost competitiveness will become an increasingly important key to success even in global niche markets and markets for sophisticated, high-quality products.

Governments have an important role to play in partnership with industry in support of technological development. It is important that the strong support for R&D through the tax system and Canada's system of intellectual property rights protection be maintained because they offer incentives for Canadian enterprises to invest in in-house R&D and technological development, where the payoff in terms of product and process innovations is greatest. Governments also have a role to play in support of the development of strategic technologies, in encouraging the development of R&D consortia, in strengthening scientific and technological excellence in Canadian universities and in other centres of excellence in Canada, and in ensuring the effective transfer of new technologies to Canadian industries.

Building Industrial Linkages and Partnerships

The prospects for a significantly improved competitive performance on the part of Canadian industries in the 1990s will be enhanced greatly to the extent Canadian firms succeed in building effective partnerships that link them in pursuit of new technologies or international markets; and that link manufacturers to their suppliers and customers, to centres of technological expertise, to educational and training institutions, and to foreign enterprises via joint ventures and strategic alliances.

Industry also needs to work in partnership with labour to ensure a significantly improved labour relations climate and to facilitate the development and implementation of organizational innovations into Canadian enterprises and the development of a more flexible and rewarding work environment. The knowledge-intensive Canadian economy of the 1990s not only requires first rate educational and training systems, but also greater participation of workers, new labour-management relationships and the innovative organization of work. In this environment, close consultation between labour and management is required. Labour and management have much to gain from a cooperative approach: firms gain from increased productivity and labour gains through safeguarding employment, improved wages and working conditions, and greater job satisfaction.

All Canadians, not just governments, labour, and industry, need to work together more effectively in addressing virtually all of the major issues impacting international competitiveness — a high regard for entrepreneurship, an international market orientation, support for technological and human resource development, and the building of a better training and educational infrastructure.

Strengthening the Canadian Market Economy

The most fundamental role for governments in support of international competitiveness is to create an economic environment that is responsive to the needs and aspirations of Canadian industries, firms and workers. Considerable room remains to improve Canada's international competitiveness by working together (industry, labour and government) to raise industrial productivity and to create a more stable economic environment characterized by greater price stability and lower government demands on financial markets — all of which will contribute to lower interest rates and an exchange rate that reflects Canada's overall competitive position.

Governments have made great progress in strengthening the Canadian market economy via tax reform, international trade and investment liberalization, and regulatory reform. However, it is clear more needs to be done on the international market access side via continuing efforts to reduce trade barriers to U.S. and overseas markets, the successful completion of the MTN and negotiation of a NAFTA, and on the regulatory reform side via increased efforts to ensure government regulatory regimes and approaches do not unduly disadvantage Canadian industrial competitiveness.

Governments at all levels need to work together more effectively in support of a more competitive and prosperous economy in the 1990s. Given that interprovincial barriers to trade and the mobility of labour and capital are so antithetical to the achievement of internationally competitive Canadian industries, the removal of these barriers by 1995 should be at the top of the economic policy agenda of the federal and provincial governments.

Conclusion

The international competitiveness agenda for the 1990s is clearly a highly challenging one for all the stakeholders, but the stakes are very great indeed — Canada's future prosperity. Our goal in the Prosperity consultations is to develop a plan of action based on the consensus reached on how best to address the competitiveness agenda issues — to build on our competitive strength and overcome our competitive

weaknesses. What is required from all the stakeholders is a sense of national purpose and partnership. However, although governments, taxpayers, workers, and consumers may all agree on objectives, achieving prosperity through competitiveness will turn, ultimately, on the abilities of our business management to develop and implement successful corporate strategies appropriate to the global competitive environment of the 1990s.

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